the OIL AND GAS JOURNAL

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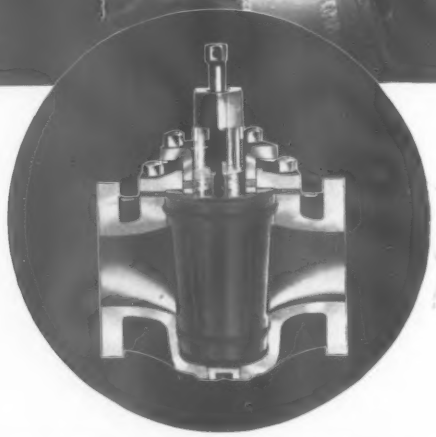

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published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE AVE., TULSA 1, OKLAHOMA

Subscription rate to the petroleum industry, United States and foreign, 1 year, $6.00; 2 years, $10.00; 3 years, $12.00; 5 years, $15.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879.

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Vol. 43, No. 45 March 24, 1945

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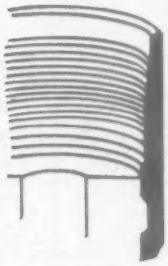

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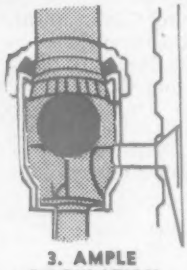

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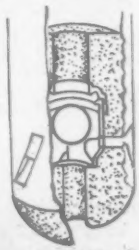

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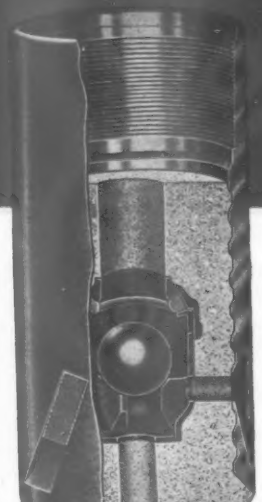

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Trends

Crude-Oil Production
By States—Page 114

CRUDE-OIL STOCKS 218,760,000 bbl. as of March 10—up 85,000 bbl. One year ago 236,748,000 bbl.

GASOLINE STOCKS 96,876,000 bbl. as of March 10—down 727,000 bbl. One year ago 85,269,000 bbl.

RESIDUAL FUEL-OIL STOCKS 44,150,000 bbl. as of March 10—down 871,000 bbl. One year ago 51,868,000 bbl.

GAS OIL AND DISTILLATE STOCKS 27,001,000 bbl. as of March 10—down 1,109,000 bbl. One year ago 32,685,000 bbl.

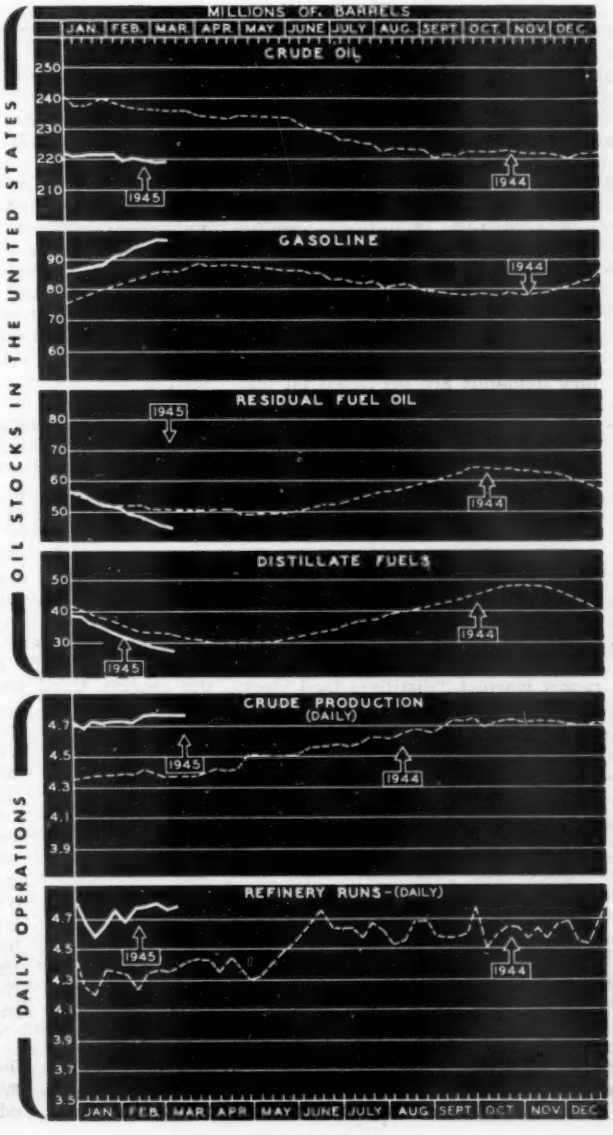
CRUDE OIL PRODUCTION 4,763,700 bbl. as of March 17—down 7,050 bbl. One year ago 4,391,590 bbl.

REFINERY RUNS 4,777,000 bbl. daily week ended March 10—up 24,000 bbl. One year ago 4,418,000 bbl.

A RULING by the Fifth Circuit Court of Appeals at New Orleans that "the whole cost of the well is supposed to be covered in the percentage depletion" inspired meetings this week throughout oil-producing states at which operators frankly admitted their inability to continue development drilling if the decision stands. Thus, the drilling and producing branches of the industry faced a more serious threat to their operations than had resulted from the most critical periods of equipment shortages throughout the war. Directly affected, of course, is the entire war program. Without the privilege of expensing the cost of wells and forced, by terms of the circuit court decision, to capitalize outlays for drilling and scores of completion services, the industry will be shorn of its capacity to meet military demands.

PETITIONERS in the case argued strongly that "the hole is of value only if oil is found, and then only as long as the sands will produce." In denying the argument that therefore a well is a proper chargeable expense to the business of producing oil, the court said: "The Congress in every revenue act has defined expenses and stated plainly what could not be treated as expense; and has provided for oil and gas wells modes of depletion for returning the capital invested in them."

DISTRIBUTION this week of copies of the opinion by various petroleum industry trade associations fomented immediate reaction. Some operators predict that drilling activity will slump 25 to 50 per cent when full import of the ruling permeates through the industry. Ceiling prices on crude and products, already below the level at which diminishing returns set in, will not tolerate this new attack on the industry's economic structure, tax experts declared. Tangible results will be obscure until the industry can devise a course of action but it would not be surprising to see a direct appeal to Congress for clarification. Regulations of the Internal Revenue Bureau long have permitted the option of charging off drilling costs to expense or depreciating the outlay over a term of years. Congress, of course, is cognizant of tax regulations and it is reasonable to assume that revenue committees would have long since taken action if the Fifth Circuit Court's decision reflects intent of the legislative branch.



Increase in Military Demands Forces Operating Goals Upward

by Henry D. Ralph

WASHINGTON. — An increase of 75,000 bbl. per day in requirements for aviation gasoline and a moderate rise in demand for other types of military motor fuel are the chief factors in a prediction made here last week before the Petroleum Industry War Council that operations in all branches must be lifted to even higher levels.

The PIWC committee on economics advised refiners that they will be called upon to run at maximum capacity throughout the year. Producers were told that daily average output would have to be approximately 5,337,000 bbl. Translation of the PIWC predictions into realities occurred promptly with certification to Texas early this week of an April production quota averaging 2,330,000 bbl. daily, including increases of 10,000 bbl. in West Texas crude output and 4,000 bbl. of natural gasoline and condensate.

The economics committee based its projections on the assumption that both the European and Pacific phases of the war will continue throughout 1945 because the military demands are predicted on that premise.

Plans for greater utilization of serviceable foreign refineries during the last half of 1945 were disclosed in the PIWC report.

The net export demand on the United States, the economics committee said, is calculated on the basis that all serviceable foreign refineries will be put into operation by July 1.

"Regardless of the termination of the European war," the economic report warned, "distillate feed stock requirements for catalytic-cracking facilities will continue to increase and a serious problem must be faced by the (domestic) industry to produce and store enough kerosene and heating oil during the coming summer to insure adequate supplies next winter."

A probable increase in petroleum imports from South America is indicated by the report. It is planned, according to the report, to supply the East Coast refining industry with the maximum volume of South American light crude and the maximum of South American heavy crude that can be utilized. This program, the committee said, was designed to minimize overproduction in PAW District 3.

Transportation aspects of the PIWC report were computed on a substantial reduction in tanker movement between Gulf Coast and East Coast ports because military authorities are urging the industry to repay stocks and compensate for diverted shipping space created by the necessity to meet emergency deficiencies on the Atlantic Seaboard during the winter. The committee said it would be desirable to maintain coastwise tanker movement at or above winter levels and thus free tank cars for shorter hauls from refining centers in District 2 and in transportation of crude into the Middle West where deficiencies in processing stock continue.

The committee urged prompt action to insure shipments from District 2 to District 1 via Great Lakes tankers at the rates of 39,000, 60,000 and 30,000 bbl. per day during the second, third and fourth quarters. The projected averages, the committee said, could be achieved without difficulty provided 80-octane all-purpose gasoline and other military products are handled via lake tankers and the New York barge canal.

Total oil requirements, the report anticipated, will taper off during the second and third quarters to 5,261,000 and 5,165,000 bbl. daily, respectively, rising again in the last 3 months to 5,451,000 bbl. per day.

TABLE 1—TOTAL DEMAND BY DISTRICTS
(Thousands of Barrels Daily)

	Average			1945 by Quarters				
Dist.—	1942	1943	1944	First	Second	Third	Fourth	Year
1	1,375	1,439	1,766	2,035	1,826	1,762	1,993	1,904
2	1,280	1,250	1,263	1,273	1,310	1,311	1,304	1,300
3	760	760	870	860	877	886	905	882
4	92	94	.107	107	114	121	112	114
5	756	912	1,005	1,194	1,134	1,085	1,137	1,137
U.S.	4,263	4,455	5,011	5,469	5,261	5,165	5,451	5,337

TABLE 2—RUNS TO STILLS (1945 ESTIMATED)
(Thousands of Barrels Daily)

	Actual average			1945 by Quarters				
Dist.—	1942	1943	1944	First	Second	Third	Fourth	Year
1	548	633	803	799	835	835	830	831
2	1,129	1,117	1,177	1,255	1,200	1,200	1,200	1,200
3	1,259	1,358	1,659	1,796	1,720	1,725	1,720	1,723
4	87	86	102	99	115	118	114	115
5	631	723	802	854	876	876	876	874
U.S.	3,654	3,917	4,543	4,731	4,746	4,754	4,740	4,743

Council Seeks to Retain Industry's Technicians

WASHINGTON.—Resolutions were adopted by the Petroleum Industry War Council meeting here March 14 calling attention to the necessity of retaining technical employes if military production schedules are met in field, transportation and refinery operations and pointing out the desirability of staffing the Petroleum Administration for War with experienced personnel. Another resolution directed the technical advisory committee to study the new Navy explosiveness test for fuel oil with the view of standardizing it for general use by the oil industry.

"Further loss of technical men in all branches of the industry and particularly those engaged in the complicated operations of a modern refinery," the PIWC resolution declared, "will increase the hazard and jeopardize all operations of the industry."

There is serious doubt, PIWC discussions disclosed, that the explosiveness test now specified by the Navy for residual fuel oil is reproducible. Steps have been taken to determine the views of the various district committees concerning the necessity for the proposed specification on a nation-wide basis.

The PIWC resolution on PAW personnel urged the respective units of the industry to comply promptly with requests from the federal agency for experienced men to conduct its affairs.

A.A.P.G. to Transact Only Necessary Business

The fourth wartime conference of the American Association of Petroleum Geologists, scheduled for March 20-22, has been cancelled in compliance with the request of James F. Byrnes, director of war mobilization and reconversion. In accordance with the rules of this request and with the constitution and bylaws of the association, the executive committee has called the required annual meeting of the business committee and of the association on March 27, at Tulsa. Only necessary association business is to be transacted. Technical papers that would have been read at the meeting will be published in the Bulletin.

The executive committee will meet March 26, and the incoming and outgoing executive committees will meet March 28.

Postwar Interim Should Be Used To Build Up Inventories

IN an analysis of postwar inventories of crude oil and petroleum products in the United States prepared for the American Institute of Mining and Metallurgical Engineers, Albert J. McIntosh, Socony-Vacuum Oil Co., Inc., economist, declares that in his opinion present crude-oil inventories are too low.

Most petroleum economists have forecast a considerable decline in total consumption of petroleum and its products in this country in the period immediately following V-J Day. This will be caused by the elimination of most of the military demands, and the inability of civilians to immediately replace automobiles, burners, etc., and thus increase their requirements to make up for the military decline. McIntosh urges that this period of lower consumption be used as a stopgap to rebuild war-depleted inventories and help cushion the effect on producers and refiners by this sudden drop in requirements.

The industry, according to the economist, expects to have on hand at the end of the current month, 445,000,000 bbl. of crude and products. At the end of the year this figure will probably be 450,000,000 bbl. These are the minimum stocks necessary to deliver over 5,000,000 bbl. per day of the individual products required at the proper places.

490 Million by 1947

Assuming V-J Day happening sometime before December 31, 1946, McIntosh sees no reason why the industry should not have on hand about the same quantity at the end of 1946 as it is estimated it will have at the end of 1945, with the one exception of residual fuel oil, which may be considerably higher.

The industry could more conveniently carry on its business if it were able to maintain a crude-oil inventory of about 230,000,000 bbl., including 35,000,000 for the Pacific Coast, McIntosh declares.

His analysis indicates that inventory levels could be built up to about 490,000,000 bbl. by the end of 1947. Therefore, the greatest quantity that the industry should anticipate putting back into inventories is about 40,000,000 bbl. If the military by the end of the war have some 20,000,000 bbl. on hand, this inventory will either be resold to the industry or certain demands which have been assumed to be met by industry will be supplied out of these military stocks and the industry would have to back up a similar quantity in its own tanks.

The final conclusion is that the industry most likely can figure on running about 10,000,000 bbl. more in its refineries in 1947 than the demands would indicate, and use these excess runs for inventory building. This would make the industry inventories of products as follows:

Forecast for Dec. 31, 1945, or 1946. Total refined products	230,000,000 bbl.
Est. of military inventory of finished products	20,000,000 bbl.
Total—Industry and military	250,000,000 bbl.
Inventory requirements (Maximum 1947)	260,000,000 bbl.
Total which can be run and stored as finished products	10,000,000 bbl. or 27,500 bbl. per day

In addition to the above 10,000,000 bbl. of finished products which refineries could run for inventory rebuilding, producers most likely could count upon the production of 10,000,000 bbl. for rebuilding crude inventories as such because the present outlook is that industry may wind up the war with about 220,000,000 bbl. on hand.

In summary, the analyst believes the industry could use 10,000,000 bbl. of products plus 10,000,000 bbl. of crude for stock rebuilding without exceeding proper economic levels and causing waste through leakage or evaporation. Spread over a year, this would mean 55,000 bbl. a day. Should crude-oil demand drop from 4,700,000 bbl. a day to 4,000,000 bbl. after V-J Day, then producers could count on 4,055,000 bbl. a day as needed for demand and stock-building, and refiners, instead of cutting back the whole 700,000 bbl. a day, could figure on a reduction of only 672,500 bbl. a day.

U. S. Members of I.S.A.P. Accorded Equal Status

MONTEVIDEO. — The permanent international council of Instituto Sudamericano del Petroleo has directed that active-member status be extended to individuals and corporations in the United States, thus giving them equal standing with South American members. The council wishes to establish promptly the United States section of the institute, bringing together oil men and companies interested in maintaining close contact with the petroleum industry in South America. Requests for information should be addressed to Instituto Sudamericano del Petroleo, Av. Agraciada 1464, P. 9, Montevideo, Uruguay.

Revised Oklahoma Unitization Bill Ready for House Action

OKLAHOMA CITY. — A revised draft of House Bill 257, the Oklahoma unitization proposal, this week was scheduled for approval by the oil and gas committee, passing the controversial issue to the legislative calendar for further action.

The new version stipulates that a field must be fully defined before the area becomes subject to provisions of the unitization bill. Furthermore, the measure provides that objection by operators controlling 20 per cent of the productive acreage would void unitization proposals. In the previous measure submitted to the Oklahoma House oil and gas committee there was no requirement that productive limits of an area should be defined before the Corporation Commission was empowered to act on an application for unitization. Also, the earlier bill contained a blockading clause prohibiting unitization if owners of 25 per cent of the acreage objected.

Some of the opposition to House Bill 339 measure, it was felt here, will be quieted by insertion of the requirement that field limits must be established before a producing area becomes subject to unitization. Doubt remains, however, that the bill, which is designed to foster secondary-recovery and pressure-maintenance operations, has the necessary support to push it through the legislature.

Revisions in text of the bill were made last week at a meeting of oil attorneys, producers and members of the House oil and gas committee. Five attorneys representing independent operators and an equal number from major companies composed the official industry representation in the deliberations although numerous operators participated in the discussions, indicating the wide interest in the bill.

Brown Cites Legal Justification For Increasing Price Ceilings

WASHINGTON. — Legal justification for an increase in the price ceiling on crude oil exists in the present law if the Office of Price Administration would interpret the law as intended by Congress, Russell B. Brown, general counsel of the Independent Petroleum Association of America, declared in a statement last week to the Senate committee on banking and currency which is considering extension of the law.

In refusing to increase crude prices, Brown said, OPA has failed to comply with directions in the law to give consideration to recommendations of industry advisory committees, failed to raise price ceilings which are an impediment to obtaining maximum needed production, and failed to recognize established accounting procedures.

The last point, he explained, was OPA's refusal to consider present replacement costs of crude now being produced although this follows the recognized accounting method of valuing inventories on the "last-in-first-out" basis.

Brown told the committee that the OPA has insisted on a price-fixing formula on crude oil that takes into account chiefly the earnings of a few companies, principally those that refine, transport and distribute petroleum and its products. The producer, who has only raw material to sell, has been ignored in the calculations.

Effect Felt by Consumers

The effect of the policy is felt by the consumers and it has been intimated by the Petroleum Administration for War that an increase in military demands will leave even less for the civilian user, Brown said. He added that the long-promised relief through increase in imports has not materialized, nor is there prospect that there will be enough gain in that direction this year to be of any help to the civilian user in the United States. Aboveground stocks of crude oil have already been reduced below the figure necessary as a proper working level.

Continued production of oil in excess of the efficient rate can result only in early declines of daily production in fields so operated, he said.

"From time to time," said Brown, "OPA has justified its course (on crude oil prices) by referring to the published earnings of a carefully selected group of large companies. It is a fact that less than 20 oil producing companies have increased their aggregate production of crude oil in this country by an amount greater than the total increase in production for the entire country in the same period. This means that the remainder of the 18,000 to 20,000 oil producers in the aggregate have suffered a decrease in their production and with increased labor and material costs and a frozen price per barrel, those remaining 18,000 to 20,000 oil producers could not have enjoyed an increase in earnings. OPA's method of cost survey wherein it permits the use of low cost figures to wash out the higher cost figures of independent oil producers does not allow this fact to come to light."

Cost Survey Under Way

A cost survey is now being instituted by the OPA, following the recommendation of the House small business committee, and an advisory committee of oil producers has been appointed by OPA but, said Brown, "even now that committee is finding difficulty in reconciling the views of the industry as to the proper factors to be included in the survey with the views of the OPA.

"The principal differences in viewpoint are so fundamental," he said, "as to bring us here once more to seek congressional aid—not in the form of specific dollars and cents price legislation—but in a declaration in the law that will admit of no alternative construction."

Army Decides to Abandon Canol Immediately

WASHINGTON. — The Army is abandoning the entire Canol oil project immediately instead of June 30, it has notified the Senate war investigating committee.

Chairman Mead told the Senate that the Army's announcement of abandonment came in the midst of another study the committee was making on Canol, and as a result of discussions with the committee the War Department has now informed it that purchase of crude at Norman Wells has already stopped and the 100-octane section of the Whitehorse refinery has been shut down. The pipe line and the rest of the refinery will be closed down by April 1, and placed on a caretaker basis. About 281 employes of Canol will be returned to the United States, and the Petroleum Administration for War is assisting in placing them in refineries here. Senator Mead said that if these workers had been employed at only two refineries in the United States they would have increased the production of 100-octane gasoline by 2,000 bbl. per day, compared with a production of 216 bbl. of 100 octane per day at the Whitehorse refinery during February, 1945.

Oil Compact Commission To Meet June 15-16

OKLAHOMA CITY. — The next quarterly meeting of Interstate Oil Compact Commission will be held in Oklahoma City, headquarters of the commission, on June 15-16. Only officials of the commission, its committees, and authorities on the subjects to be considered at the meeting will be invited to participate in the 2-day session.

"The executive committee voted to streamline future quarterly meetings of the commission to meet in spirit and practice the emergency orders of the Office of Defense Transportation limiting the size of meetings and conventions," Earl Foster, commission secretary, said. "Although two more states have recently joined, Montana and West Virginia, and the work has greatly increased in volume and importance since the beginning of the war, the commission will continue to exert its every influence in furthering the war effort."

Free Italians to Help Finish Arabian American Refinery

WASHINGTON. — Petroleum Administration for War has been advised that 1,200 free Italians, virtually stranded at Eritrea, Africa, have been employed by Arabian American Oil Co. to work on construction of its Ras Tanura refinery in Saudi Arabia. This will enable contractors to rush an important segment of the United Nations petroleum military program to completion ahead of schedule.

C. Stribling Snodgrass, director of PAW's foreign refining division, reported that the skill of the Italian laborers is rated unusually high. They were employed until recently on an American construction project in Eritrea after the British took over the Italian colony. The families of the 1,200 Italians were returned to their homeland in 1941 and 1942. The laborers signed up with the Arabian American Co. to accumulate enough money to return to Italy.

This Week

ECONOMICS— Texas oil producers have invested $1.12 for every dollar's worth of crude recovered from 1889, when first commercial production was found, to January 1, 1945, Mid-Continent Oil and Gas Association reports. . . . Money spent in the 55 years totaled $11,513,636,604, against $10,247,138,250 received for the oil. . . . ¶Dean James M. Landis, Harvard Law School, says Middle East certain to be world's oil center in postwar period. . . . Economic rivalries growing out of shift from United States could incite war. . . . ¶War Department says barrel of products from Whitehorse refinery, part of Army's abandoned Canol project, cost $11.15. . . .

PRODUCTION—California Co. opens new field in Bayou district, south of New Orleans. . . . Discovery flowing 230 bbl. from Miocene. . . . ¶Continental 1 Goodstein, South Elk Basin, Wyoming, flows 148 bbl. hourly on drill-stem test. . . . Company has 5,760 acres under lease. . . . Nearest production 3 miles north. . . . ¶Nation's daily crude output down 7,050 bbl. . . . Largest drop in Illinois. . . . Texas' quota for April raised 14,000 bbl., all-time record of 2,330,000 bbl. daily certified. . . .

REFINING—Arabian American Oil Co. employs 1,200 Free Italians to work on completion of Ras Tanura refinery in Saudi Arabia. . . . Had been stranded in Africa. . . . Contractors now expect to finish ahead of schedule. . . . ¶Refiners advisory committee meets in Washington to consider survey of refinery costs. . . . Will present suggestions to OPA. . . .

TIRES—DPC authorizes funds for two additional projects in heavy-tire expansion program. . . . Brings total of these projects to 37. . . . ¶WPB issues restrictions on use of crude rubber in manufacture of large truck tubes and further limitation of use of carbon black for various rubber products. . . . ¶Rubber Reserve Co. says synthetic-rubber output to be greatly expanded this year to meet rising military and essential civilian transport needs. . . . ¶New carbon-black facilities rushed to boost production of this tire ingredient. . . . DPC hopes to raise present monthly output of 80,000,000 lb. to 94,000,000 by July. . . . Actually need 100,000,000 lb. . . . ¶Butadiene plants granted special selective-service status, to protect technically trained men. . . .

TRANSPORTATION— ODT says freight transportation critical. . . . No material improvement in sight. . . . ¶Situation aggravated by freshets. . . . Tank-car oil shipments to East Coast dropped 26,093 bbl. daily to average of 491,198 as result of floods tying up rail movement. . . . ¶Demurrage charges on boxcars go higher April 1. . . . Reason given is necessity of speeding freight movement in face of boxcar shortage. . . .

DRILLING— Drilling is "capital investment, no part of which can be called expense," for federal tax purposes, appeals court rules. . . . Costs may be absorbed by depletion allowance only. . . . ¶Drilling-equipment shortage caused drop of 2.44 per cent in Argentina's 1944 oil production. . . . Had risen steadily from 1934 to 1944. . . . That country and United States reached agreement in 1943 whereby Argentina was to receive drilling equipment and in return supply oil to Uruguay, Paraguay and southern Brazil. . . . Wasn't signed. . . . Then came revolution. . .

FOREIGN— Egypt hopefully expanding oil operations. . . . Production already begun in one new field. . . . Negligible in volume, but significant. . . . Government striving to make country self-sufficient in oil after war. . . . Exploratory work pushed. . . . ¶Mexico's oil reserves rise to 800,000,000 bbl. . . . ¶Creation of world-wide union of oil workers forecast by Vincente Lombardo Toledano, president Latin-American Federation of Labor. . . .

No ordinary, run-of-the-mine refinery is this for here this week was processed the billionth barrel of crude oil to pass through its tanks, stills and fractionators. It is the Aruba refinery of Lago Oil & Transport Co. on an island in the Dutch West Indies off the coast of Venezuela. It is the world's first refinery to process 1 billion barrels of crude oil, a record made even more impressive by the fact that it has been in operation only 16 years—a relatively short time as refineries go

Tidelands-Oil Ownership Fight Is Renewed in Congress

WASHINGTON. — The old fight over ownership of oil deposits underlying the nation's coastal tidelands and navigable waters has been revived in Congress with the introduction of close to a dozen resolutions declaring that title lies with the individual states rather than with the federal Government.

The cause was the recent admission of Secretary of the Interior Harold L. Ickes that he is considering granting one or more of several applications which have been filed under the public land laws for mineral locations on oil lands along the southern California coast. The lands in question are already producing oil under state leases, but the pending applications claim that the lands between the high-tide mark and the 3-mile limit are federally owned public lands and present users are trespassers.

This question has been under debate for many years and has never been definitely decided, although all the states have acted on the theory that they had complete control of tidelands and all mineral development, piers, and other structures on them. Ickes' contemplated action would develop into a test case, on the outcome of which would hinge the legality of tremendous investments in oil and other developments on tidelands of all coastal states. The proposed legislation would nullify such a threat by disclaiming any federal control.

Identical or quite similar resolutions have been introduced by Representatives F. E. Hebert of Louisiana, F. W. Boykin of Alabama, Emanuel Celler of New York, J. H. Tolan of California, Overton Brooks of Louisiana, and Clyde Doyle of California, and Senator Pat McCarran of Nevada.

OPA's Refining Industry Advisory Committee Elects Officers

WASHINGTON. — The newly appointed refining industry advisory committee to the Office of Price Administration held its organization meeting here March 15 and discussed various current price problems with OPA officials.

Officers elected were: Chairman, C. L. Henderson, president of Vickers Petroleum Co., Inc., Wichita, Kans.; vice chairman, Sidney Swensrud, vice president of Standard Oil Co. of Ohio; secretary, M. E. Foster, of Phillips Petroleum Co.; counsel, Norman L. Myers, of the Gulf Coast Refiners Association.

These men participated in the refiners' industry advisory discussion with OPA. Front row, left to right: Arthur Phelps, chief counsel of the OPA petroleum price branch; W. H. Beekhuis, assistant comptroller, Standard Oil Co. of California; Sidney A. Swensrud, vice president, Standard Oil Co. of Ohio, vice chairman of the group; C. L. Henderson, president of the Vickers Petroleum Co., chairman of the group; M. E. Foster, Phillips Petroleum Co.; Paul G. Blazer, president, Ashland Oil and Refining Co.; Eugene Uman, OPA price executive. Second row, left to right: Dr. Stewart P. Coleman, head economics department, Standard Oil Co. (New Jersey); Neil Buckley, vice president, Taylor Refining Co.; Joe L. Hill, vice president, Southport Petroleum Co.; W. H. Bennett, vice president-treasurer, Frontier Fuel Oil Corp.; C. F. Salzer, assistant to general auditor, Gulf Oil Corp.-Gulf Refining Co.; Max M. Fisher, vice president, Aurora Gasoline Co.; Roland V. Rodman, vice president, the Bay Petroleum Corp.; J. S. Worden, manager of refining operations, The Texas Co.; B. L. Majewski, vice president, Deep Rock Oil Corp.; Harry H. Fuller, manager bulk sales, Sinclair Refining Co. Third row, left to right: C. A. Johnson, chairman, Socal Oil and Refining Co.; L. T. Cramer, manager, sales administration, Continental Oil Co.; William L. Stewart, Jr., executive vice president, Union Oil Co.; D. P. Hamilton, president, Root Petroleum Co.; W. S. Zehrung, president, Pennzoil Co.; J. L. Nolan, manager oil department, Farmers Union Central Exchange; Horace G. Dale, manufacturing department, Shell Oil Co., Inc.; John W. Boatwright, manager sales research department, Standard Oil Co. of Indiana

PAW Certifies Record Production to Texas

WASHINGTON. — Petroleum Administration for War has certified to Texas an all-time record production rate of 2,330,000 bbl. daily of petroleum liquids during April.

This is an increase of 14,000 bbl. daily over the rate certified for March, of which 4,000 is expected to be natural gasoline from new plants and 10,000 West Texas crude. Tank-car shipments of West Texas crude to the Pacific Coast, now about 15,000 bbl. daily, will be increased to 20,000 bbl. in April, and the additional production will go into working inventories.

Hawkins Director of PAW's Foreign Supply Division

WASHINGTON.—Roy F. Hawkins, New York, has been appointed director of Petroleum Administration for War's foreign supply and distribution division. He succeeds William D. Crampton, who had filled that post since the division was organized in November 1943.

Hawkins went to PAW after serving 3 years as executive secretary of Petroleum Supply Committee for Latin America, on leave of absence from Standard Oil Co. of New Jersey. Previously he was managing director of Standard's subsidiary in Genoa, Italy, and before that assistant general manager of Standard's subsidiary in Buenos Aires, Argentina.

Before joining PAW in August 1941 as a consultant, Crampton was chairman of the management committee, vice president and director of Standard Francaise des Petroles in Paris, France. He plans to return to France soon to resume his duties there.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Natural Gas

THE time has arrived for the states to adopt natural-gas legislation which reflects changing conditions in production, transmission, and utilization. The war has ended a period of 85 years during which these lighter hydrocarbons have been considered largely a byproduct of petroleum activities and an orphan among fuels in consumer markets.

In the first place both the natural-gas and the petroleum industries must face the fact that the physical waste of gas can and must be reduced. No apologies need be made to the Federal Power Commission nor to any other governmental agency for what has been done in the past. Operators as a group have made every effort to conserve natural gas in line with the technical knowledge of the times and in response to an economic condition which demanded a rapidly increasing supply of petroleum.

But new techniques in crude-oil production, the results of years of research and field testing, necessitate a new approach to the question of what should be done with natural gas under widely varying operating conditions. Through control of gas-oil ratios, cycling, gas lift, pressure maintenance and repressuring, natural gas has become the principal tool in efficient production of crude oil and other petroleum liquids. It is now agreed that no natural gas should be sent to fuel markets until it has been fully utilized in bringing oil to the surface.

In this connection there is need for additional legislation in some states to assure the greatest possible use of natural gas in the fields, from the discovery well until recovery operations are no longer possible. It would also seem that new regulations should provide that any excess of lean gas in the oil areas should have first consideration in supplying the requirements of outside markets.

What happens in natural-gas markets has a very important bearing on field practices. Owing to that fact consideration should be given to the establishment of regular market-demand analyses, with the allocation of supplies used to further conservation and to assure an equitable distribution of outlets. This procedure has established its essential value in crude-oil production operations.

Closer cooperation of the producing states with the consuming areas is essential. The plans to extend federal control for the purpose of furthering political and socialized economic objectives have been apparent from the beginnings of this administration. Producers of competitive fuels have often resorted to tactics which have nothing to do with comparative values, with no regard for the expressed wishes of consumers.

There is a real danger that existing interstate controls over transmission will be extended to production and consumption and that through this backdoor method, state direction will be superseded by complete federal regulation from the wells to the burners. Because of the close association in production practices federal control of the natural-gas industry means federal control of petroleum.

These and related problems in many situations require uniform answers. If the charter of the Interstate Oil Compact Commission does not provide for collective action among the states as regards natural gas it should either be made to do so or a new interstate body should be created. Natural gas has moved into a new era, and regulatory legislation by the states must reflect that fact.

BRUCE RAMSEY

SMITH DAY

Interstate Oil Pipe Line Officials Inspect Company's Facilities

OFFICIALS of Interstate Oil Pipe Line Co. were in Tulsa last week in the course of an inspection of the company's facilities in the Mid-Continent and southern areas. On March 17 the visitors, along with local representatives of Interstate, held a conference for discussion of business matters. The visiting officials included Chester F. Smith, director of Standard Oil Co. (New Jersey), and W. R. Finney, president of Interstate, both of New York, and Smith W. Day, vice president of Interstate, Shreveport. Tulsa officials present included Bruce Ramsey, vice president, and L. F. Kahle, executive vice president, of Interstate.

Ramsey, who is manager in charge of the northern division, started working for Oklahoma Pipe Line Co., predecessor of Interstate, in 1920, and has been with that organization ever since. In 1926 he was made superintendent of the Greater Seminole area, and in 1936 he was sent to Tulsa as general superintendent. In 1943 he was promoted to vice president and manager. With the formation of Interstate at the beginning of 1945 he acquired his present title.

Day began work as a laborer for New York Transit Co. in 1905 and for the succeeding 4 years was employed by various subsidiaries of Standard Oil Co. (New Jersey). In 1909 he was transferred to Louisiana and from that time until the end of 1944 he served Standard Oil Co. of Louisiana in positions of increasing responsibility. In 1937 he was made vice president and general manager of Standard Oil Co. of Louisiana, pipe-line department, holding that post until he was named to his present one with the organization of Interstate, becoming general manager of the southern division.

Following the conference Paul Griffin, former president of Oklahoma Pipe Line Co. and retiring from active duty, was honor guest at a dinner in celebration of his birthday.

Sohio Geologist to Receive A.A.P.G. Award

CHICAGO. — William Edward Wallace, Jr., Shreveport, has been chosen as first recipient of the president's award of the American Association of Petroleum Geologists. Announcement of the selection was made here this morning by Ira H. Cram of the Pure Oil Co., association president.

This new award, established last year, is designed to "honor and reward the younger authors of original articles published in the A.A.P.G. Bulletin during each calendar year." The selection committee, made up of 10 association members and 2 ex-officio members, is headed by A. Roger Denison of Amerada, Tulsa, past president of A.A.P.G.

The honor will be conferred upon Wallace, geologist now with the Sohio Petroleum Co., during the annual business meeting of A.A.P.G. in Tulsa on March 27, and Denison will make the presentation. The award is in two parts, the first being $100 cash, and the second consists of a certificate stating that his paper, "Structure of South Louisiana Deep Seated Domes," is a significant contribution to geology.

Egypt Hopes to Supply Her Own Oil Needs After War

WASHINGTON. — Production of oil has already started in at least one new Egyptian field, and the Egyptian Government hopes that in the postwar period that country will be self-sufficient in the matter of crude supplies. Exploratory work is being pushed vigorously.

"Mine and Petroleum Association of Egypt" has been organized with the approval of the Ministry of Finance. The aims of this body are given as "intensifying the output of the mines and the production of petroleum in this country, and so developing the wealth and habitable area of Egypt, as well as furnishing profitable employment."

Senator Hassan Sadek Pasha, technical adviser to Anglo-Egyptian Oil Fields Co., is president. American members of the association's board of directors are H. W. Haight, of Standard Oil Co. of Egypt, a Standard Oil Co. of New Jersey subsidiary, and H. Quinland, of Socony Vacuum Oil Co., Inc. Socony Vacuum, Standard of New Jersey, Southern Mediterranean Oil Co. (jointly owned by The Texas Co. and Standard Oil Co. of California) and Shell Oil Co., Inc., are prospecting for oil in Egyptian territory.

Fuad El Awal University has established a Department of Mines in its Engineering School, with laboratories and courses in petroleum.

Three points in Egypt — Elarish, Port Said and Alexandria—have been considered as possible termini of the pipe line from Saudi Arabia, but the Egyptians want to develop their own oil production, and they believe they can do it.

Montana Joins Interstate Oil Compact Commission

HELENA.—The state senate has passed a house bill authorizing Montana to become a member of Interstate Oil Compact Commission. The bill was sent to Gov. Sam C. Ford, who was expected to sign it.

Montana will be the fourteenth member of the compact commission. Prospective members now include Georgia and Indiana, with Florida's next legislature expected to consider the proposition.

Suit Declared Based on "Difference of Opinion"

CHICAGO.—Standard Oil Co. of Indiana, one of six defendants named in suits filed in federal courts by Office of Price Administration alleging sales of oil products at over-ceiling prices, has issued a statement declaring it has been guilty of no intentional violation of law and asserting the action results from a "difference of opinion."

The other defendants, all operating in the Chicago district, are Sinclair Refining Co., Globe Oil & Refining Co., The Texas Co., Hughes Oil Co., and Northwest Refining Co.

Chester Bowles, national OPA administrator, said the actions were designed to "eliminate refiners' overcharges on gasoline, fuel oil and other petroleum products in the Middle West and to relieve the squeeze on jobbers and retailers."

The statement issued by Standard of Indiana follows:

"This suit is based on a difference of opinion as to whether the pricing law and regulations permit ceiling prices for certain petroleum products to be set on what is known as the 'Group 3 basis' or whether they must be based on the last sales of similar classification within the 60-day period prior to October 15, 1941, also on differences regarding the proper method of classifying customers.

"Standard Oil Co. has at all times endeavored to obey the OPA regulations, though this has been difficult in some instances owing to the uncertainty as to their applicability and meaning. We believe trial of the case will demonstrate that Standard's pricing methods were entirely correct and proper, or if not, it was because of the honest belief that the company had properly interpreted the price regulation, and without any intention to violate applicable law or regulations.

"The acts complained of in this suit took place some time ago and were in conformity with practices which are now expressly permitted by subsequent amendments to the price regulation."

ATC Conquers Obstacles In Arctic Oil Project

FAIRBANKS.—Air Transport Command flew more than 200,000 lb. of bulky cargo across the Arctic Circle last month to support the Navy's oil-drilling project at Point Barrow, thus demonstrating Army-Navy teamwork "on the roof of the world." Point Barrow is within a few hours' flying time of the North Pole, and this was the most northerly operation of the kind ever undertaken by ATC.

At Point Barrow the weather is so unpredictable that cargo-laden planes have been unable to break through the fog for a landing and had to refly the hazardous journey back here to Ladd Field with their loads. The round trip from here is more than 1,000 miles. Navigational aids are sketchy.

Maj. P. L. Reed, chief of operations at Ladd Field, flew one load north himself. It was tough cargo to wrestle, including five-ton sleds that had been used on the Army's Canol project at Norman Wells, Canada; snow jeeps weighing better than 2½ tons, lighting plants, lumber, gasoline and fuel oil.

Carter Plans Conservation Project in Magnolia Field

EL DORADO. — Arkansas Oil & Gas Commission conducted a hearing March 19 on the application of The Carter Oil Co. for approval of a salt-water disposal and pressure-maintenance system in the Magnolia field, Columbia County. Approximately 98 per cent of owners of Smackover limestone production in the field have joined in an agreement designating Carter as operator of the proposed system. Thirty-two wells in the field are now producing salt water, and it is expected all will do so eventually.

In accordance with the agreement, Carter drilled an experimental pressure-maintenance and salt-water input well, the 1 Myrtie Crisp, completing it in the Smackover limestone formation. The well was tested through 2½-in. tubing at 5,136 bbl. per day at 400 lb. tubinghead pressure, 1,440 bbl. at 0 tubinghead pressure and 1,000 bbl. at an estimated 22 in. of vacuum on the tubinghead. It is planned to replace the 2½-in. tubing string with 4-in. tubing, which it is believed will materially increase the input capacity.

It was stated at the hearing that in the opinion of engineers the tests showed the well would serve adequately for injection purposes and that other wells drilled and equipped in the same way would serve with similar efficiency. It is planned to drill three more of the injection wells.

Deferment Plan Extended To Foreign Operators

WASHINGTON. — Several additions to its memorandum on procedure for occupational deferment of oil industry employes have been issued by the Petroleum Administration for War.

Most important applies to foreign operations, and requires separate personnel and occupational lists be furnished for each country in which the employer operates. PAW has had great difficulty working with lists which included employes in several countries.

Another change explains that men in the 34 through 37 age group may be deferred if they are regularly engaged in an essential occupation, but men in the 30 through 33 age group must be both necessary to and regularly engaged in such activities.

Aviation-Gasoline Tax Bills Introduced in 28 States

WASHINGTON. — Bills designed to impose taxes on aviation gasoline were introduced in seven more states during the past 2 weeks, bringing the total gasoline-tax measures pending to 28. In Minnesota, a proposed law would put a 4-cent levy on aviation fuels. Inasmuch as there already is a 4-cent tax in that state, the effect of the bill actually is to cancel the present 4-cent refund made on gasoline used for aviation purposes.

Pennsylvania and Vermont, on the other hand, are considering measures to exempt nonhighway users from the 4-cent gasoline tax. Nebraska, Utah, Wisconsin, and Texas received bills to revise the gasoline tax or the amount of refund allowed airlines and private plane users. The Texas bill was the sixth presented in Texas in this session of the legislature involving aviation gasoline taxes.

West Virginia Is Member Of Compact Commission

CHARLESTON. — The West Virginia Legislature has adopted, without a dissenting vote, a resolution authorizing the entrance of West Virginia into the Interstate Oil Compact Commission. Walter S. Hallanan, president of Plymouth Oil Co., who has urged this step, told the legislators other states were about to join this cooperative organization.

Midwest Power Conference Cancels Annual Meeting

CHICAGO.—Stanton E. Winston, director of the Midwest Power Conference, has announced that its application before the War Committee on Conventions has been denied and the eighth annual meeting, scheduled for April 9 and 10, at the Palmer House, Chicago, has been canceled. Winston said there would be no publication of papers planned for this year's meeting.

He is not one of the 400

He is the black sheep of the gasoline family

Mercaptans (sulfur compounds) give him his foul odor

When he gets the "cure"—Unisol treatment—the mercaptans are removed—he then smells sweet—his tetraethyl lead susceptibility is improved

The Unisol process will extract the mercaptans from your gasoline

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Shell Oil Laboratory to Study Jet-Propulsion Fuels

WOOD RIVER.—A laboratory for the study of fuels and lubricants for jet-propulsion aircraft has been built and put into operation at Wood River, Ill., by Shell Oil Co. The laboratory, a complete, full-scale installation, was designed to study the action that fuels undergo in jet-combustion.

A jet burner, size and construction of which remain a military secret, has been installed; fuel is furnished by ten 5,000-gal. tanks; and compressed air, necessary for jet-combustion, is supplied by a 1,000-hp. compressor. Something new in combustion, the jet burner produces in a much smaller amount of space about 250 times the heat of a residential oil burner; creates a stream of hot gas of greater than hurricane velocity.

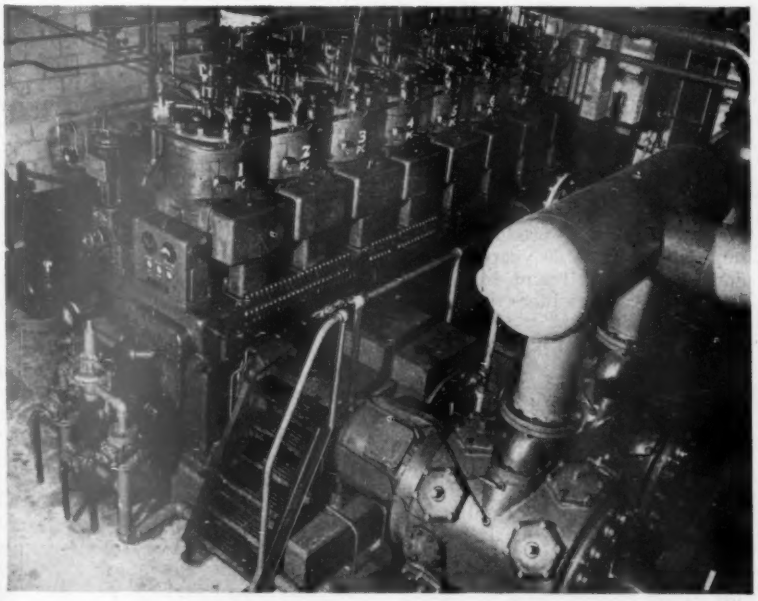
Combustion of such a radically new character requires new basic research, and completely new studies of burning characteristics of possible fuels have been undertaken. By means of elaborate electrical recording devices located in a heavily-sound proofed control room, the new laboratory is compiling performance records on fuels suitable for use in jet-propulsion and combustion turbine engines.

In addition to surveying fuel requirements, and determining characteristics and qualities of fuels most efficient for jet-combustion, the laboratory is also at work developing new experimental apparatus for further use in this type of research.

At a technical meeting called for some time this month by the Army Air Forces at the new laboratory, latest findings in the field of jet-propulsion and combustion turbine fuels will be discussed by technologists from the Army, Navy, and other oil companies.

The combustion turbine (also called the gas turbine) an important component part of the jet-propulsion engine, appears to have great possibility as a new type of prime mover which, Shell engineers feel, may eventually compete favorably with the steam turbine and diesel egine in locomotives, ships, and power houses. In aircraft other than military craft they believe that the best application of jet-propulsion will be in combination with a combustion turbine-driven propeller. Dream of engine designers for over a generation, the combustion turbine has only recently become a reality through developments in metallurgy which made possible turbine blades able to withstand extremely high temperatures, and centrifugal air compressors efficient enough to be used with the new combustion turbine.

"The engine-testing section of the Wood River laboratories is one of the most complete of its kind, containing dozens of miniature and full-scale models of aircraft, automotive, and diesel engines," according to J. F. M. Taylor, New York, Shell vice president in charge of manufacturing. "Here fuels and lubricants are tested for performance, and some of the information thus obtained has already been directly responsible for heavy contributions that Shell has made to the technology of aviation gasoline manufacture during the past few years. Since 1942, enemy fuels, both German and Japanese, have been tested and broken down into their component parts for complete analysis."



Huge compressor installation, seen here in part, supplies compressed air used by the jet-burner at Shell's jet-propulsion laboratory. Compressors are powered by combustion of refinery gases in power chambers labeled 1-8PC

Gilmore Oil Co. Is Merged With General Petroleum

LOS ANGELES.—Gilmore Oil Co., whose stock has been owned for years by General Petroleum Corp. of California, was consolidated with the latter company last week. Operations will continue under the management of General Petroleum, West Coast marketers of Mobilgas and Mobiloil. Road oil and asphalt operations will be handled by a Gilmore organization.

Merging of the two organizations results in the appointment of Mark Butterworth as resident manager, and J. B. Erickson as assistant resident manager of the Southern California division.

C. S. Beesmeyer and John C. Sample were elected to the board of directors of General Petroleum.

Subsidy Bill Passed by Senate, Sent to House

WASHINGTON.—A bill to authorize the continued payment of subsidies on petroleum and other products by the Reconstruction Finance Corp. and its subsidiaries during the coming fiscal year has been passed by the Senate and sent to the House.

The bill permits the use of up to $290,000,000 during the fiscal year ending June 30, 1946, in subsidizing crude production from stripper and high-cost wells and rail shipment of petroleum as alternatives to increases in price ceilings.

It was estimated that $150,000,000 will be used to subsidize petroleum shipments into District 1; $20,000,000 to subsidize crude shipments to refineries in District 2; $45,000,000 for crude shipments to West Coast, and $75.000,000 to make premium payments to producers of crude from stripper and high-cost wells.

Creole's January Production Declines

NEW YORK. — Crude-oil production from properties operated by Creole Petroleum Corp. in Venezuela in January 1945 averaged 390,245 bbl. daily, compared with 393,653 bbl. for December 1944.

Lake Maracaibo fields contributed 288,693 bbl. daily of the January output compared with 290,231 bbl. daily in December, while the eastern Venezuelan fields produced 101,552 bbl. daily in January, against 103,422 in December.

During January, 15 test wells were completed by Creole, of which 14 were oil-producing wells in proven fields with aggregate initial output of 2,589 bbl. daily. Of the producing wells, seven were in the Jusepin oil field, five in the Mulata field and two in the Lake Maracaibo fields.

In addition to the producing wells, one exploratory test well was completed as a dry hole at total depth of 7,060 ft.

Creole ran at its two Venezuelan refineries an average of 43,422 bbl. of crude daily during January, of which 34,393 were run at the Caripito refinery and 9,030 daily at the La Salina plant. In December these refineries handled 33,797 bbl. and 6,243 daily, respectively.

The Socony-Vacuum Oil Co., Inc. is coring at 5,719 ft. at its wildcat in the Barinas area of Venezuela, 1 San Vicente, and has two drilling operations under way in the San Joaquin and three in the Guico section of the Oficina district. Guico 6 was reported testing at 6,930 ft.

In Colombia, Socony-Vacuum and Tropical Oil Co. jointly are reaming their Sinu district wildcat, 1 Floresanto at 6,103 ft. Colombian Petroleum Co. (Socony and Texas Co.) reports five drilling operations under way on the Barco concession, one at Tres Bocas and four at Socuavo.

Lack of Equipment Lowers Argentine Production

WASHINGTON. — Crude production in Argentine last year fell 2.44 per cent below that of 1943, owing to need of drilling equipment, obtainable at present from the United States only, according to information received here. Although the decline is small, it is significant in view of the fact that during the preceding decade there had been a steady rise in output.

Production in 1944 was 3,852,000 cubic meters, equal to 24,000,000 bbl. Two-thirds of this was produced by the state oil monopoly and one-third by private companies.

Shortly before the revolution of June 4, 1943, the United States and Argentina had reached an agreement whereby Argentina was to receive drilling equipment from the United States and in return was to supply oil to Uruguay, Paraguay and southern Brazil. The agreement was not signed, however, and fell through completely after the revolution.

Oil News Radio Program Started by Lane-Wells Co.

HOUSTON.—The Lane-Wells Co. is sponsoring an oil news radio program "News of the Oil World—Today." The initial broadcast was from station KTRH, Houston, at 5:30 p.m., March 19. This 15-minute oil news broadcast will be heard from this station 5 days a week, Monday through Friday, at the same time each day.

A-15 Coupons Validated

WASHINGTON. — A - 15 gasoline ration coupons became valid March 22. Each A-15 coupon will be worth 4 gal. until June 21, leaving the present value of A coupons unaltered.

Service station operators, the Office of Price Administration announced, will have remainder of this month in which to assemble A-14 coupons which became invalid at the start of the new rationing period.

DEATHS

William J. McDowell, 84, retired oil producer, died March 12 in Reno, Pa., where he had resided 77 years. At 16 he drilled oil wells, later becoming a drilling contractor and then an operator. His father, the late John McDowell, was a pioneer producer in the Reno field; his brother Harrison is a producer in Reno, and another brother, the late Edward McDowell, was a producer in the same area. Some 60 years ago William J. McDowell and his brother Harrison were fielders in the old Reno baseball team, made up of oil men and famous in its day.

First Lt. Maurice L. Asbury, fighter pilot, who was a clerk in the shipping department of Tide Water Associated Oil Co., Tulsa, when he entered war service in June 1942, was killed in action February 27. He had completed 12 combat missions with the Twelfth Air Force in Italy and had received the Air Medal with several clusters and the Distinguished Flying Cross.

Werner W. Schroder, 48, an attorney for The Texas Co., died March 16 in Houston.

George Horton, 70, president of Chicago Bridge & Iron Co. and widely known in the oil industry, died March 19 in Chicago of injuries suffered in an automobile accident the day before. He had been with Chicago Bridge & Iron Co. 51 years, its president 35 years.

Lt. John B. Warren, Jr., 33, widely known in the oil industry, was killed in action while serving as executive officer and assistant gunnery officer on an attack transport in the Pacific theater. Upon graduating from Rice Institute in 1933 Lieutenant Warren joined Humble Oil & Refining Co. in the engineering department. He resigned to do graduate work at University of California, after which he was employed by Quintana Petroleum Co. at Refugio, Tex. He invented a device for automatically determining and recording the specific gravity of drilling mud and in 1939 he organized Warren Automatic Tool Co., for the marketing of oilfield specialties of which he was the inventor.

Robert C. Grinnell, 68, pioneer oil producer and equipment manufacturer, died March 17 in Houston. He drilled one of the first wells in the Spindletop field, Texas, and later became president of Peake Oil Co., Braniff Engineering Co. and Wilma Petroleum Corp. of Texas. He formed Fluid Packed Pump Co. of California, whose production was converted to war work after Pearl Harbor. He built a railroad in Mexico and acquired mining interests before entering the oil business. He was an aviation enthusiast.

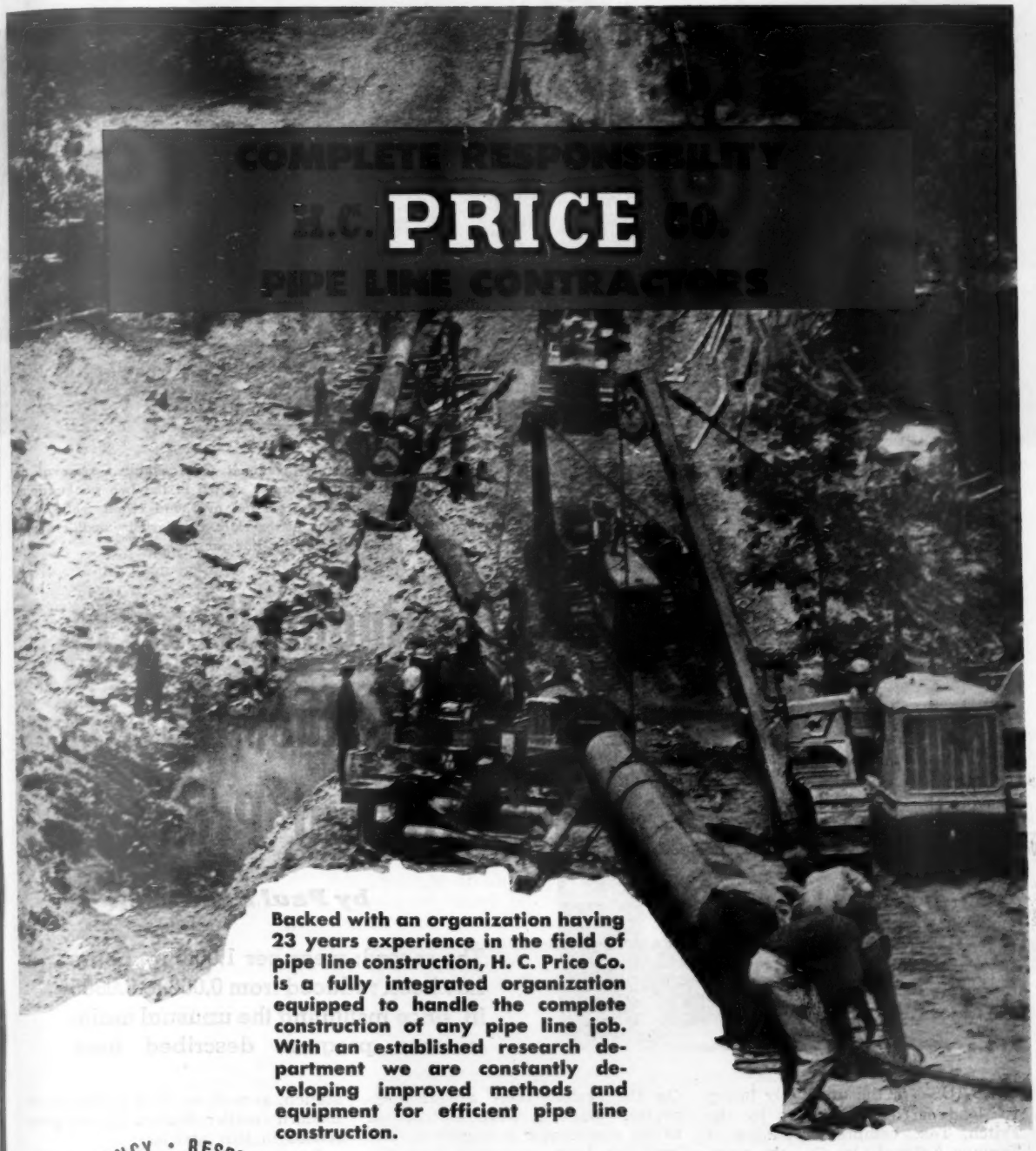
Courtland S. Dines, 55, who had extensive oil interests in Oklahoma and Texas, died March 13 in Denver. In World War 1 Dines served as an aviator.

Harry Miller, 55, manager of the Linden, N. J., district for Standard Oil Co. of New Jersey, died March 7 in Newark.

William W. Agnew, 76, retired oil producer, died March 12 in Parkers Landing, Pa.

W. M. Peyton, 61, oil operator of Mexia, Tex., was killed in an automobile accident March 14. He was the last member of the firm of Peyton Brothers, with oil holdings in Texas and Louisiana.

William H. McCalip, 53, assistant superintendent of gasoline plants for United Gas Pipe Line Co., died in Shreveport March 13. He had been in that company's service more than a quarter-century, starting as a driller's helper. He was a veteran of World War 1.



Backed with an organization having 23 years experience in the field of pipe line construction, H. C. Price Co. is a fully integrated organization equipped to handle the complete construction of any pipe line job. With an established research department we are constantly developing improved methods and equipment for efficient pipe line construction.

Illustrated: Tennessee Gas & Transmission Company project, a joint venture of BETCHEL • DEMPSEY • PRICE

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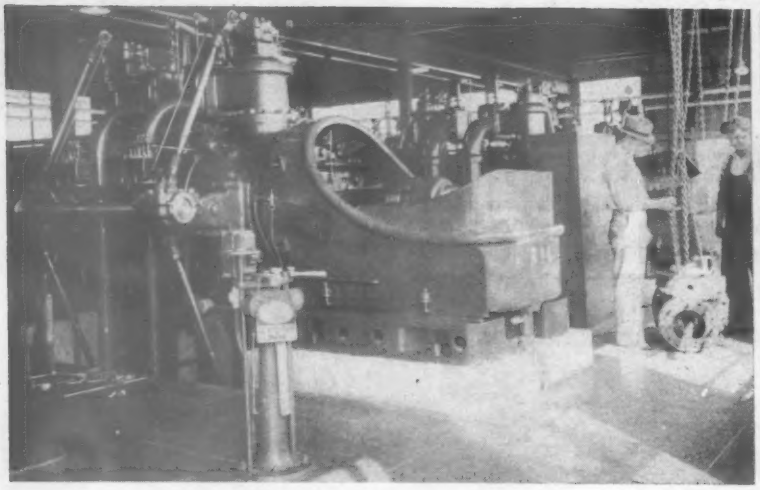
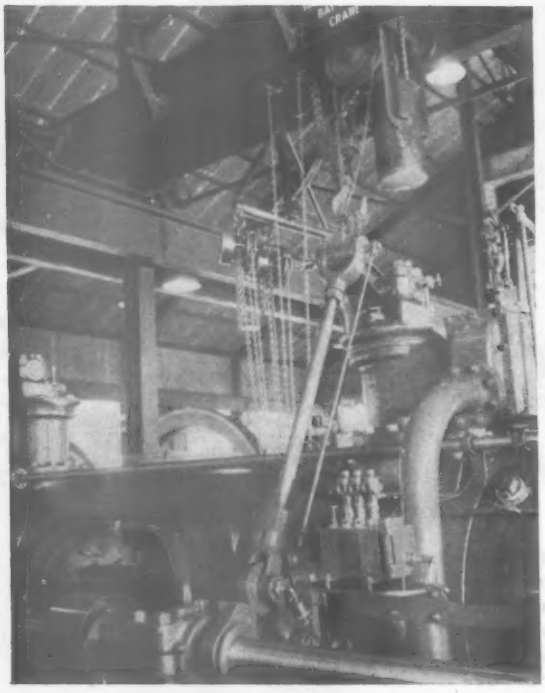




The chain hoist equipment developed for facilitating removal of exhaust valves from compressors is shown in the two photographs at the left. It is suspended from the overhead crane while it is being operated. In the view at the right, combustion conditions are being checked by flue-gas indicator

Cylinder Wear Is Reduced by Efficient Program

by Paul Reed

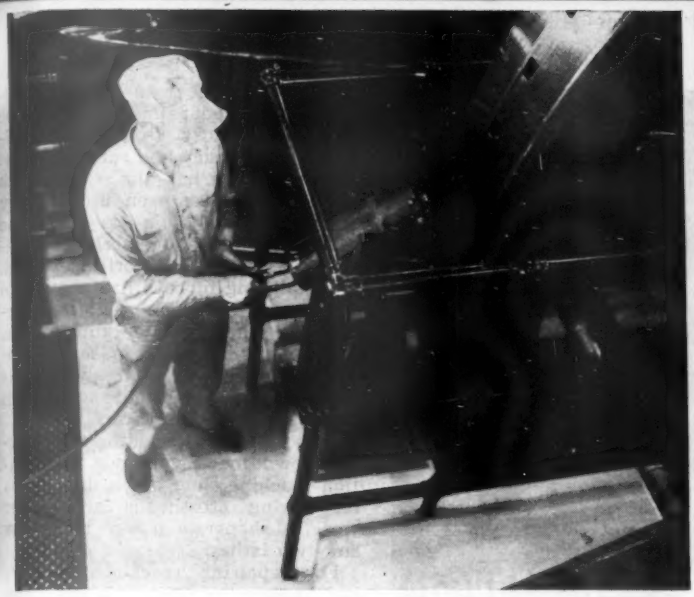
The record: wear per 1,000 hp. hours has been reduced from 0.002 to 0.0005 in. since instituting the unusual maintenance program described here

BECAUSE of the unusually heavy load carried constantly by the Fritch, Tex., compressor station of Texoma Natural Gas Co., the practices followed there have been significant for the industry. Fritch is the initial station on the extensive system, referred to in the industry as the Chicago line, the Texas end of which is operated by Texoma. The remainder of the system is operated directly by Natural Gas Pipeline Co. of America.

The system was built in 1931, according to design providing for transmitting 175,000,000 cu. ft. daily at pressure of 600 lb. The line is 900 miles long of 24-in. diameter, ⅜-in. wall pipe with 425 miles of 26-in. diameter, ¼-in. wall "loops." On the system there are 11 compressor stations with a total of 85,900 compressor horsepower. The load has been increased from the original one averaging 175,000,000 cu. ft. daily in 1936 to 265,000,000 cu. ft. under present conditions.

Within the last 5 years a program has been carried out for increasing the efficiency of operations. The success of a combination of measures contributing to better combustion conditions is reflected in the records of the last few years, which show that the cylinder wear has been reduced from 0.002 in. to 0.0005 in. per 1,000-hp. hours. The principal features of the program for efficient operation and the unusual maintenance procedure at Fritch station, as well as those at the more modern smaller Station 22, are presented in this article.

Fritch station has fifteen 1,300-hp. Worthington horizontal compressors for main-line service and three 420-hp. Cooper-Bessemer vertical gas-engine-driven electric generators; the station operates with suction pressures of 140 to 240 lb. and discharge pressures of approximately 740 lb. At Station 22, 10 miles away, there are four 1,000-hp. Cooper-Bessemer horizontal compressors and two 600-hp. Worthington vertical units. The remaining nine stations on the line have either five or six 1,300-hp. compressor units and two 260-hp. vertical units.



Left: Pneumatic jack device operating on the principle of an air hammer devised by an employe to turn the flywheel of a compressor. Right: Each shift engineer has an individual tool chest

The program carried on in the last 4 years, to improve combustion, reduced the wear of power cylinders from 0.002 in. per 1,000-hp. hours to 0.001 in. within a year and later to 0.0005. Now an effort is being made to reduce it to even less than 0.0005 at all Natural Gas Pipeline Co. of America stations.

Combustion conditions are checked at frequent regular intervals by a flue-gas indicator known as a heat prover. The reduction in cylinder wear achieved by effort in the last 5 years has raised efficiency of the station, and it is possible that capacity for carrying peak loads may have increased 5 to 10 per cent by combined effect of measures taken.

Reduction of Algae

The continuous water-softening sodium zeolite and hydrogen zeolite system has a capacity of 780 g.p.m. After treatment of the water, chlorine and ammonia are added to the water to reduce algae in the cooling towers. All water is treated at the gasoline plant connected with the station which has a Fluor aerator cooling tower, operating with an open system.

Water storage has been planned so that in case of power failure there is a sufficient supply for operating the plant for an hour. The water tanks include a 100,000-gal. elevated conosphere and a 250,000-gal. cylindrical tank which both contain system water.

To remove water hammer and eliminate resulting damage to water-cooled power piston rods, air at 15-lb. pressure is injected continuously, with the cooling water to the pistons. Air pressure is developed by a small compressor in the auxiliary room.

In the basement of the Fritch compressor plant, the water pumps are driven by an Elliott gas turbine. Part of the engine fuel expanded in the turbine supplies sufficient power for this purpose.

For the cooling of exhausts in some of the stations, advantages have been obtained by changing from water cooling to air cooling. This step has eliminated rusting, leakage of water in the basements, and trouble due to the deposition of moisture from the wet exhausts on the buildings.

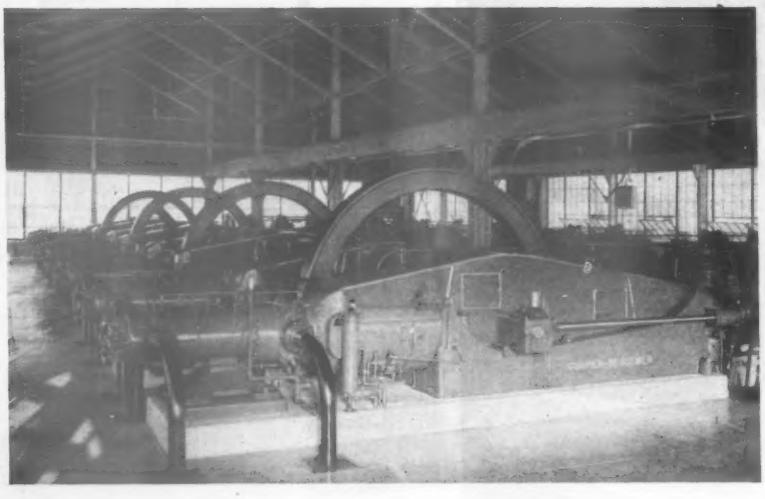
Pneumatic Jack Facilitates Starting

The starting of the large units at Station 22 is facilitated by a pneumatic jack device operating on the principle of an air hammer. This was developed by one of the employes. It has proved to be effective in turning the flywheel conveniently and rapidly, thus eliminating the laborous method of barring.

With the exception of the maintenance program at Fritch, just mentioned, units at other stations along the line from Texas to Chicago are not overhauled by a year-around program but are overhauled in the spring and fall. In these seasons it is possible to utilize men from pipe-line maintenance gangs when their work in the field is slack.

The all-around yearly overhaul program at Fritch insures that a heavy load at high pressure shall be carried continuously. Of the 15

The Fritch station has fifteen 1,300-hp. compressor units



Four 1,000-hp. compressor units at Station 22

units only 2 are regarded as spares.

Each unit is completely overhauled in four stages which comprise a complete overhaul in the course of a year. The first of these four stages or jobs consists of overhaul of the power cylinder, power packing, power rings, and cams.

The second job is normally a complete compressor overhaul. Between the second and the third jobs attention is given to mixing and inlet valves. The third job is on the power end of the unit again. This includes work on the exhaust valves which are usually overhauled on each unit twice a year. Other work of the third job is overhauling bearings and usually gears, cranks and slides. If considered necessary, main bearings are attended to. However, the policy is to overhaul main bearings as seldom as practicable because the less they are worked on the more satisfactory is the service to be had from them. At all of the 15 units at Fritch station not more than five main bearings are usually overhauled in an entire year. If necessary intermediate and tail slides are checked. The fourth job is the second overhaul of the exhaust valves. It is believed that no other natural-gas pipe line has an overhaul program organized according to such a plan.

A new policy at Fritch station has been that of using removable inserted seats for exhaust valves made with a special alloy. Test results have been so satisfactory that 20 exhaust valves have already been replaced by the removable inserted seats and others will be replaced in the course of overhauling.

Two different practices are followed in removing exhaust valves. At Fritch a special attachment has been made for overhead crane which consists of a crossarm from which a chain hoist is suspended. By means of this, exhaust valves can be quickly and conveniently raised. At Station 22 a gooseneck device is used of a kind which has been successfully adopted at stations on several lines.

Each shift engineer has his own chest with a large assortment of tools for making numerous small repairs while on duty. The chest is locked when he is absent from the plant.

For repairing cracked cylinders, power cylinder heads and other equipment, the chain-lock or cold-welding procedure has proved to be very satisfactory from the standpoint of accuracy and serviceability. So successful has the chain lock been that it has been unnecessary to buy power cylinders for some time as cylinders formerly discarded have been satisfactorily repaired.

Metallizing of rods has proved to be very effective in restoring surfaces to their former dimensions. After metallizing and machining on a lathe, rods meet all requirements of service and stand more wear than the original surface of the rod.

In addition to the lathe for turning down metallized rods, the station machine shop has a drill press for boring crossheads and other work, a shaper, a power hack saw and two lathes.

For repairing cracked cylinders and power cylinder heads, the chain-lock or cold-welding process has proved to be so satisfactory that it has not been necessary to use annealing equipment for the purpose installed at the station several years ago. At the station there is also an annealing furnace for repairing exhaust valves which was made especially for the company.

Don Thompson, geologist, formerly with Sunset Oil Co., Los Angeles, has joined Hilo Oil Co., that city. **Mike Leonard** has been named drilling superintendent and **Fred Fraley** purchasing agent for Hilo.

Sun Employes Rewarded for Safety Ideas

THERE'S a cool $1,000 in ideas represented in this group of Sun Oil Co. employes at Marcus Hook, Pa. A. W. MacMurtrie (left), manager of the refinery, is presenting a $500 war bond to Charles F. Havercamp, electrician, who has been judged first-place winner in the company's 1944 safety campaign suggestion contest at Marcus Hook. Others in the group include Jacob Mahla, construction boilermaker, $100 war bond for the best slogan; Joseph W. Plummer, gas-compressor operator, $100 war bond for third prize in suggestion contest; Artemis Jenkins, $200 for second prize in suggestion contest, and Edith Guyer, personnel department, $100 war bond for best poster.

Examples on Displacement Of Oil and Water

*by Park J. Jones**

Mechanics of Producing Oil, Condensate, and Natural Gas

PART 21 OF A SERIES

Curves on displacement of oil by water from a point in a reservoir were derived in the preceding article. The curves may be used directly in estimating oil recovery from 1 bbl. of reservoir space. Aside from gravity, the curves may also be used to obtain the per cent cut in the production from a barrel of space.

Oil recovery from a reservoir by water displacement is equal to the sum of the recoveries from individual points. The recovery from individual points may vary from zero up to 90 per cent of the oil originally in place. Point recovery, and therefore oil recovery from a reservoir, is influenced by several factors. Among these are (1) location and number of wells, (2) rate of production, (3) operating pressures, (4) permeability and variations in permeability, (5) effect of gravity, (6) economic limit in barrels of oil per day per well, and (7) economic limit in barrels of water per barrel of oil. Consequently, the curves cannot be applied directly to oil recovery from entire reservoirs.

Nevertheless, there are some types of production problems for which a reasonable estimate can be made directly from the curves for point data. Under certain conditions oil recovery from reservoirs or from a well is controlled by water saturation, pressure difference, and water-oil ratio at economic limit. Problems of this type are illustrated in this article by examples and graphs.

Illustrative Example 1

ESTIMATE the oil recovery from a point in a reservoir without help from gravity under the following conditions:

Viscosity of reservoir liquid = μ_L = 2.5 centipoises.

Volume factor of reservoir liquid = b = 1.3 bbl./bbl.

Viscosity of water = μ_w = 0.81 centipoises.

Per cent cut at economic limit = 95.

In this example:

$$A = \frac{\mu_w}{b\,\mu_L} = \frac{0.81}{1.3 \times 2.5} = \frac{1}{4}$$

From Fig. 20-6 corresponding to ¼ and 95 per cent cut, oil recovery = 66.7 per cent; and from Fig. 20-7, 63.7 per cent.

These recoveries refer to no change in the viscosity and volume factor of the reservoir liquid. In addition, the estimate includes the following assumptions: (1) No help from gravity, (2) no free gas, (3) uniform permeability, and (4) the volume of water through a barrel of reservoir space does not exceed the volume required to achieve the indicated oil recoveries. More water would give higher recoveries.

Illustrative Example 2

Estimate the per cent cut and total volume produced under the conditions of Example 1. The following tabulation is based on Fig. 20-6.

Oil produced, % of oil in place		Per cent water in production	Oil and water produced, % of oil in place	
Going	Cumulative		Going	Cumulative
15	15	None	15	15
5	20	2.0	5.1	20.1
5	25	8.0	5.4	25.5
5	30	15.5	5.9	31.4
5	35	25.5	6.7	38.1
5	40	38.0	8.1	46.2
5	45	52.5	10.5	56.7
5	50	66.0	14.7	71.4
5	55	78.0	22.7	94.1
5	60	86.0	35.7	129.8
5	65	91.0	55.5	185.3
1.7	66.7	94.0	28.3	213.6

The foregoing data are plotted in Fig. 21-1. These data are exclusive of help from gravity and they refer to 1 bbl. of reservoir space. Recoveries in bbl. / acre - foot are for 10 per cent interstitial water and 28 per cent porosity.

Per Cent Water in the Initial Production

The data in Figs. 20-6 and 20-7 of the preceding article can be cross-plotted as shown in Figs. 21-2 and 21-3. Per cent water in the initial production is expressed in terms of type of media, its water content, and viscosity ratios. The effect of viscosity of reservoir liquids is emphasized by these curves.

For example, when the viscosity of water to reservoir liquid is on the order of ⅛, a 60 per cent cut

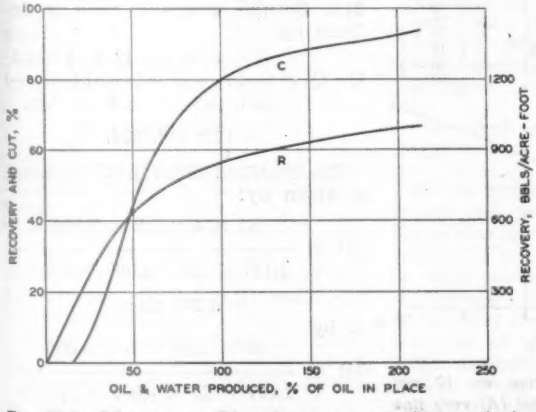


Fig. 21-1—Oil recovery (R) and per cent cut (C) vs. oil plus water produced in per cent of oil initially in place; data are based on 1 bbl. of reservoir space

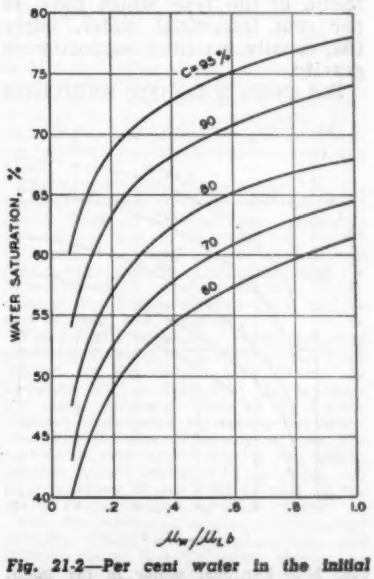


Fig. 21-2—Per cent water in the initial production (C) from medium to coarse sandstones and from limestones vs. water saturation and viscosity ratio

*Production consultant, Houston.

in the initial production is indicated for water contents of media ranging from 40 per cent to 60 per cent. But when the viscosity ratio is on the order of one, water contents of media ranges from about 62 per cent up to 73 per cent for 60 per cent cut in the initial production. The per cent cut in the initial production varies with viscosity ratio and characteristics of media.

Illustrative Example 3

An electric log shows 70 per cent water saturation in a fine-grained sandstone. Will it pay to set pipe? The answer depends on several factors including the cost of pumping which fixes the per cent cut at the economic limit. For example, let the following conditions exist:

$\mu_w = 0.8$; $\mu_L = 1.33$; b = 1.2; cut at economic limit = 95 per cent

In this example, $\mu_w/\mu_L\, b = 0.5$.

From Fig. 21-3 corresponding to 0.5 at 70 per cent water saturation the water in the initial production is 60 per cent. Corresponding to 95 per cent cut, the saturation is 81 per cent. So the ultimate oil recovery cannot exceed (81 — 70)/(1 — 70) or 36.7 per cent of the oil originally in place. If the acre-feet of pay downdip between the well and the source of water is ample, pipe would be set and the cost of doing so would pay out.

Flowing Wells vs. Per Cent Cut

Some wells will not flow when the per cent cut increases up to 10 per cent. Fig. 21-4 illustrates water saturation at 10 per cent cut vs. type of media and viscosity ratio. Media of the type which have 40 per cent interstitial water, curve (A), usually get little support from gravity.

But media of the type which have 10 per cent interstitial water, curve (B), would have, in the absence of help from gravity, a 10 per cent cut when the oil recovery is only 20 per cent to 30 per cent of the oil initially in place. Whereas, with help from gravity, the oil recovery is on the order of 40 per cent to 60 per cent at 10 per cent cut. By producing oil at a rate for which gravity can function in the latter type of pay, curve (B) in Fig. 21-4 is shifted upward and near to curve (A).

Consequently, producing rates as well as location and completion of wells relative to water are the controlling factors as to per cent in the production. Producing rates and well locations also determine how much of the space in a reservoir is invaded by water.

Illustrative Example 4

What is the maximum possible oil recovery by flowing under the following conditions?

Wells quit flowing at 10 per cent cut.

Interstitial water = 20 per cent.
Viscosity of water = 0.6 cp.
Viscosity of reservoir liquid = 0.4.
Volume factor for reservoir liquid = 1.87.

In this example:

$\mu_w/\mu_L\, b = 0.6/(0.4 \times 1.87) = 0.8$

From Fig. 21-4 at 0.8 and curve (A), water content = 59.5.

The corresponding oil recovery equals (59.5 — 20)/(1 — 20) = 49.4 per cent of the oil in place.

This recovery is with help from gravity but no help from gas.

Displacement of oil by gas will be considered in a later article.

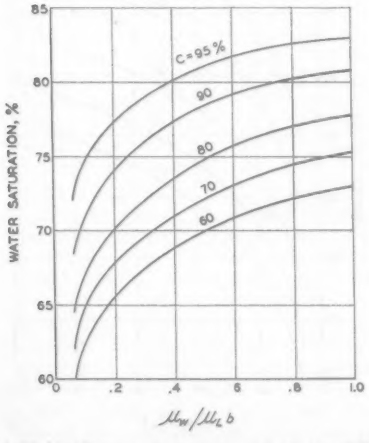


Fig. 21-3—Per cent water in the initial production (C) from fine to very fine sandstones vs. water saturation and viscosity ratio

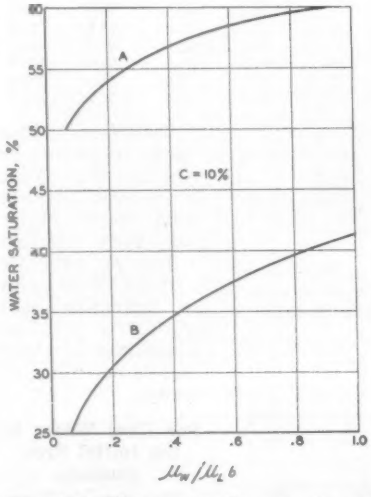


Fig. 21-4—Water saturation vs. 10 per cent cut and viscosity ratio: (A) very fine sandstone; (B) coarse sandstone and some limestones; with help from gravity, curve (B) is shifted near to curve (A)

Pressure Difference Required to Displace Oil

The pressure difference required to displace reservoir liquids by water will now be considered. It follows from Darcy's law for linear displacement that:

$$\Delta P = \frac{Q_o\, \mu_L\, b\, L}{1.127\, A\, K_L} = \frac{Q_w\, \mu_w\, L}{1.127\, A\, K_w} \quad (1)$$

where

A = area, sq. ft.
b = volume factor, bbl./bbl.
ΔP = pressure difference, p.s.i.
Q_o = rate of oil production, bbl./day
L = distance across which ΔP exists
Q_w = rate of water production, bbl./day
K = effective permeability, darcys

The effective permeability of a pay to a fluid is equal to the product of the permeability of the pay and the relative permeability of the pay to the fluid.

Illustrative Example 5

What produced water-oil ratio and pressure difference is required to recover 60 per cent of the oil originally in place under the following conditions?

Rate of displacement at economic limit = 50 bbl. oil per day.
Viscosity of reservoir liquid = 4.0 cp.
Interstitial water = 40 per cent of porosity.
Permeability of pay = 100 md.
Pay thickness = 20 ft.
Width of pay = 1,000 ft.
Length of pay = 3,000 ft.
Viscosity of water = 1 cp.
Volume factor = 1.2 bbl./bbl.

In this example:

The total water saturation relative to 60 per cent oil recovery for 40 per cent interstitial water is 40 + (0.6 × 60) = 76 per cent.

From Fig. 20-2 at 76 per cent water saturation, K_L = 8.0 and K_w = 21.5. So the water-oil ratio is defined by:

$$Q_w/Q_o = \left(\frac{K_w}{K_L}\right)\left(\frac{\mu_L\, b}{\mu_w}\right) = \left(\frac{21.5}{8}\right)\left(\frac{4 \times 1.2}{1}\right)$$

$$= 12.9 \text{ bbl./bbl.}$$

The required differential pressure is given by:

$$\Delta P = \frac{50 \times 4 \times 1.2 \times 3{,}000}{1.127 \times 20 \times 1{,}000 \times 0.008}$$

$$= 4{,}000 \text{ p.s.i.}$$

or by

$$\Delta P = \frac{50 \times 12.9 \times 1 \times 3{,}000}{1.127 \times 20 \times -{,}000 \times 0.0215}$$

$$= 4{,}000 \text{ p.s.i.}$$

The pressure gradient in this ex-

ample is 4,000/3,000 or 1.33 p.s.i./foot. The pressure gradients found in practice are much less except in the immediate neighborhood of well bores or across partially plugged liners.

Illustrative Example 6

If in Example 5 the available pressure difference is only 1,000 p.s.i., what is the ultimate oil recovery and the water-oil ratio at abandonment?

In this case K_L = 4,000/1,000 × 8 = 32 per cent. From Fig. 20-2 at K_L = 32 per cent for 40 per cent interstitial water, the total water saturation is 62 per cent. The corresponding oil recovery is (62 — 40)/0.6 = 36.6 per cent of the oil originally in place. At 62 per cent total water saturation, K_w is 5 per cent and the water-oil ratio (5/32) (4 × 1.2) = 0.75 bbl./bbl. Under the conditions of this example a reservoir would have to be abandoned with only 36.6 per cent its oil content recovered by water displacement. It will be shown in a later article why under some conditions the recovery by gas displacement exceeds the possible recovery by water displacement.

Examples 5 and 6 are based on the assumption that effective permeability is independent of position. In other words, it was assumed that liquid saturation is independent of position. This is not in accord with the conditions in reservoirs. Distribution of oil saturation between wells, between wells and edge water, or between producing and injection wells, is not uniform. Distribution of oil saturation is influenced by gravity, capillarity, and total volume of water through a point in the reservoir.

Illustrative Example 7

It follows from Darcy's law for radial displacement that:

$$\Delta P = \frac{Q_o \mu_L b \log R/r}{3.07\, h\, K_L} = \frac{Q_w \mu_w \log R/r}{3.07\, h\, K_w} \quad (2$$

where

h = pay thickness, ft.
r = radius of a well bore, ft.
R = distance between wells or to ultimate source of fluid

The other symbols have the same meaning as in the preceding sections.

What produced water-oil ratio and pressure difference is required in order to recover 50 per cent of the oil in place about a well under the following conditions?

Water encroaches from all directions.

Economic limit = 3 bbl. oil/day = Q_o.

Pay thickness = 20 ft. = h.

Diameter of well bore = 6 in.

Distance = 660 ft. = R.

Viscosity of reservoir liquid = 8.0 cp. = μ_L.

Viscosity of water = 1 cp. = μ_w.

Permeability of pay = 50 md.

Interstitial water = 40 per cent.

Volume factor = 1.1 bbl./bbl.

In this example the water saturation at 50 per cent oil recovery = 0.5 (100 — 40) + 40 = 70 per cent.

From Fig. 20-2 in the preceding article, the relative permeability to reservoir liquid at 70 per cent water saturation is 16 per cent and to water, 12.5 per cent. The produced water-oil ratio

$$= \left(\frac{K_w}{K_L}\right)\left(\frac{\mu_L b}{\mu_w}\right) = \left(\frac{12.5}{16}\right)\left(\frac{8 \times 1.1}{1}\right)$$

$$= 6.88 \text{ bbl./bbl.}$$

For the given conditions:

Log 660/¼ = 3.42; K_L = 0.05 × 0.16 = 0.008; K_w = 0.05 × 0.125 = 0.00625.

The pressure difference is given by:

$$\Delta P = \frac{3 \times 8 \times 1.1 \times 3.42}{3.07 \times 20 \times 0.008} = 185 \text{ p.s.i.}$$

or by

$$P = \frac{3 \times 6.88 \times 1 \times 3.42}{3.07 \times 20 \times 0.00625} = 185 \text{ p.s.i.}$$

Illustrative Example 8

Evary third row of wells having 330 ft. staggered spacing is made a water-injection well. What is the approximate pressure difference required in order to recover 70 per cent of the oil initially in place in the invaded region; and what is the least water-oil ratio at abandonment under the following conditions?

Economic limit = 2 bbl. oil/day.

Pay thickness = 20 ft.

Viscosity of reservoir liquid = 6 cp.

Permeability of pay = 100 md.

Viscosity of water = 1 cp.

Interstitial water = 10 per cent.

Volume factor of reservoir liquid = 1.1 bbl./bbl.

Diameter of producing wells = 6 in.

Diameter of injection wells = 12 in.

In this example the injection wells are in the center of hexagons and fluids diverge radially[1] for approximately 75 per cent of 330 ft. or 248 ft. and converge over 82 ft. The divergence occurs within a sector of 60° and the convergence, within a sector of 120°. In this example, water saturation at 70 per cent recovery from the invaded region equals 0.7 (100 — 0.1) + 0.1 = 73 per cent; K_L = 4.5 per cent; K_w = 34.5. The water-oil ratio at abandonment = $\frac{34.5 \times 6 \times 1.1}{4.5 \times 1}$ = 46 bbl. water/bbl. oil. Log. 248/½ = log 496 = 2.70; 60° sector = one-sixth of a circle.

Log 82/¼ = log 328 = 2.52; 120° sector = one-third of a circle.

The approximate pressure difference over the 248 ft. is defined by:

$$\Delta P_{248} = \frac{2 \times 6 \times 1.1 \times 2.70}{3.07 \times 20 \times 0.0045} (6) = 775 \text{ p.s.i.}$$

and over the 82 ft., by:

$$\Delta P_{82} = \frac{2 \times 6 \times 1.1 \times 2.52}{3.07 \times 20 \times 0.0045} (3) = 362 \text{ p.s.i.}$$

The total required pressure difference between injection and producing wells is approximately 1,137 p.s.i. If (1) the available pressure is substantially less than 1,137 or (2) the economic limit is substantially less than 46 bbl. water/bbl. oil, the oil recivery from the invaded region under the conditions of the foregoing example could be substantially less than 70 per cent of the oil initially in place in the invaded region. The invaded region, or invasion factor, in this example is on the order of 90 per cent.

References

1. Muskat, M., Flow of Homogeneous Fluids, McGraw-Hill Book Co.

BOOKS

THE MODERN GAS TURBINE. By R. Tom Sawyer. Prentice Hall, Inc., 70 Fifth Avenue, New York. $4.

Filling a need for an up-to-date, practical, yet authoritative work on the engineering, theory, and practice in this rapidly expanding field, this work is a brief presentation of the subject of primary interest and usefulness to engineers. It takes up first the fundamental concepts and engineering principles on which gas turbines and jet-propulsion units are based.

The author takes up the work of Buchi, Buckett, Stirling, Ericsson, and the more recent work of Sanford Moss especially. The old-newness of the researches on gas turbines is emphasized; he points out that a very definite, even controlling relationship exists between the heat resistance of the metals making up a turbine and its life and efficiency.

The book is adequately illustrated with drawings showing the principles and main features of the various turbines already designed, and outlines their shortcomings and advantages and where in his opinion improvements must be made. He shows that the thermal efficiency of the gas turbine is well below that of the spark-ignition engine (about 16-18 per cent), and is only about 40 per cent of that of the diesel or compression-ignition engine.

For the advanced engineer the author includes Chapter V on Calculations and Efficiencies of Gas Turbines, written by R. B. Smith, who states that now turbines may be designed which will operate 10 years or more at 1,200°F. without excessive damage or cost.

PLANT PRACTICES

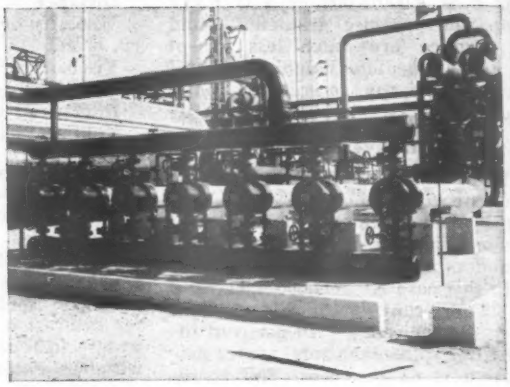
Propane-Refrigerated Food Locker Room

THE building shown here contains a quick-freeze-room, a curing room, and a locker room that are refrigerated with propane. Maintained by the company for its employes the unit does not require close attention because of the automatic-control arrangement for each of the three different low-temperature zones. Ordinary temperature recording-controllers with motor

valves for regulating propane expansion are used. Kept at 0° F. the locker room is provided with 50 commercial locker units, each measuring about 24 in. by 24 in. by 36 in. The quick-freeze compartment is held to —20° F. during the seasonal periods for preparing fruits and vegetables for locker storage and curing-room temperatures are maintained at 38° to 40° F. at all times. Yearly operating expense to the company is shown to be negligible.

Gasoline Cooler Back-Washing System

THE bank of exchangers shown in the photograph is in gasoline-cooling service. Arranged so that each unit in the bank may be backwashed at regular intervals by reversing the direction of water flow, the operation requires but a few minutes' time. This method of tube cleaning indicates a 75 to 80 per cent decrease in fouling rates for the particular plant. By tapping the inlet and outlet ports of the exchanger head, connecting a high-pressure gas line into the normal outlet port and installing a drain line from the normal inlet port, the back-washing operation is made relatively simple. The back-washing procedure is carried out by closing the normal water inlet and outlet valves at the exchanger, then opening the gas pressuring valve and lastly the drain valve. To put the exchanger back into service, this procedure is reversed with the exception



that the trapped gas is vented by opening the cooling water outlet valve first after the gas pressuring and drain valves have been closed. Venting of the gas to atmosphere is carried out until a steady stream of water flows from the vent line.

Sand Filter Made From a Section of A Discarded Boiler

THIS vessel is made from a section of a scrapped fire-tube boiler. Operating at low pressures as a water filter the vessel is constructed with flat heads made of ½-in. plate and with a charging opening in the top head. By utilizing the original manhole in the boiler for a cleanout opening, very little labor and material was required to construct the unit. Measuring 7 ft. high by 4.5-ft. diameter the filter efficiently handles from 45 to 50 gal. of water per minute. Connected into a closed system the unit filters a slipstream of about one-twenty-fifth of the total circulated water used for engine jacket cooling at plant. The filter bed is made up of four zones as follows: ¾ to 1-in. gravel 1.21 ft. deep; ½ to ¾-in. gravel 0.47 ft. deep; ½ to ⅛-in. gravel (and coarse sand) 0.47 ft. deep, and 0.4 to 0.5 mm. sand 2.6 ft. deep. Total thickness of the bed runs to 4.75 ft. Peak efficiency of the unit for filtering is shown to be around 3 gal. of water per minute per square ft. of cross-sectional area; backwash rates are approximately four times greater.

(The ideas described on this page are used in Gregg-Tex Gasoline Corp.'s plant at Longview, Tex.)

Gas-Actuated "Jeep" Pump Is Automatic in Operation

by Neil Williams

NOT having a suitable pump of conventional type at hand for the particular job to be performed, operators in one of Coastal Louisiana's isolated, marsh-located fields devised a gas-actuated "jeep" pump to cycle gun-barrel bottoms and oil through a heater. The device, simple in construction and operation, has proved efficient and effective. It has been trouble free, requires a relatively small volume of gas to function, and its operation is entirely automatic.

Construction and operation of the device are shown in the accompanying diagram (Fig. 1). Its installation is pictured in Fig. 2. It consists of a chamber in which the fluid to be cycled is received and expelled by alternating relief and intake of gas pressure, with a float mechanism for operating the inlet and outlet gas valves.

The chamber is constructed of a section of large-sized pipe, about 16 in. in diameter and from 4 to 5 ft. long. The bottom end of the pipe is closed with a welded plate, while the top is fitted with a bolted flanged cover to permit access to the interior, and through which the float-operated gas valve mechanism is installed. The unit, set vertically in the ground, is installed on the buried 4-in. oil circulating line from the gun-barrel to the heater. The latter line which passes through sides of the unit at the bottom end, has an opening into the interior of the chamber and is fitted with two flapper-type check valves, one on each side of the opening at the inlet and outlet sides, respectively, of the chamber.

These valves are reverse acting and function so that when the valve on the inlet side opens to allow oil from the gun barrel to fill the chamber, the valve on the outlet side closes, this action being automatic by the pressure of the incoming fluid stream. In turn, when the chamber is filled and gas pressure is applied at the top to empty the fluid, the outlet valve opens and the inlet valve is forced closed.

The float on the inside which manipulates the inlet and outlet gas valves at the top for alternately emptying and filling the chamber rides a small rod which passes through the center. The rod is fitted with two float stops, one near the top and the other near the bottom. As the float, moving with the fluid level, contacts these stops, it raises or lowers the rod, as the case may be, and in turn operates the inlet and outlet gas valves.

The rod moves through a small stuffing box in the cover of the chamber to prevent escape of any gas from the chamber around the rod. The gas valves are operated by means of a flat cross bar fastened on the top end of the valve rod. One side of the bar contacts the plunger which opens and closes the valve in the gas inlet line, while the other side contacts the plunger of the valve in the gas outlet line. The two valves work conversely so that as the fluid from the gun barrel fills the chamber and the float contacts the upper stop and lifts the valve rod the cross bar closes the valve in the gas outlet line (which is open while the chamber fills) and at the same time opens the valve in the gas inlet line (Fig. 1). Then, as the inlet gas fills the chamber and forces the fluid out the bottom outlet the float lowers until it contacts the bottom stop on the valve rod, and by pushing down on the rod, reverses the cycle, closing the gas inlet valve and opening the valve in the gas outlet line, allowing the fluid from the gun barrel, by gravity flow, to fill the chamber again.

Gas inlet and outlet lines consist of 1-in. pipe, and a relatively small volume of gas and pressure is required for the operation. The gas is taken off a nearby field gas supply manifold. This pump has a circulating capacity of approximately 78 bbl. per hour with sufficient pressure to cycle the fluid through the heater and back to the gun barrel in a continuous "rolling" operation. The rate of circulation can be varied as desired by regulating the volume and pressure of the inlet gas. Capacity of this pump is approximately equivalent to that of a 6-in. by 4-in. by 6-in. conventional reciprocating pump. Smaller or larger-capacity pumps can be provided by use of smaller or larger chambers.

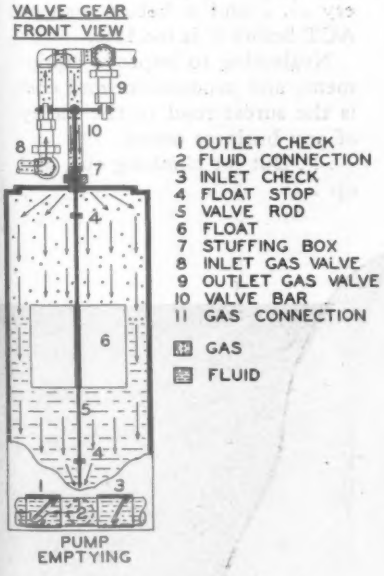
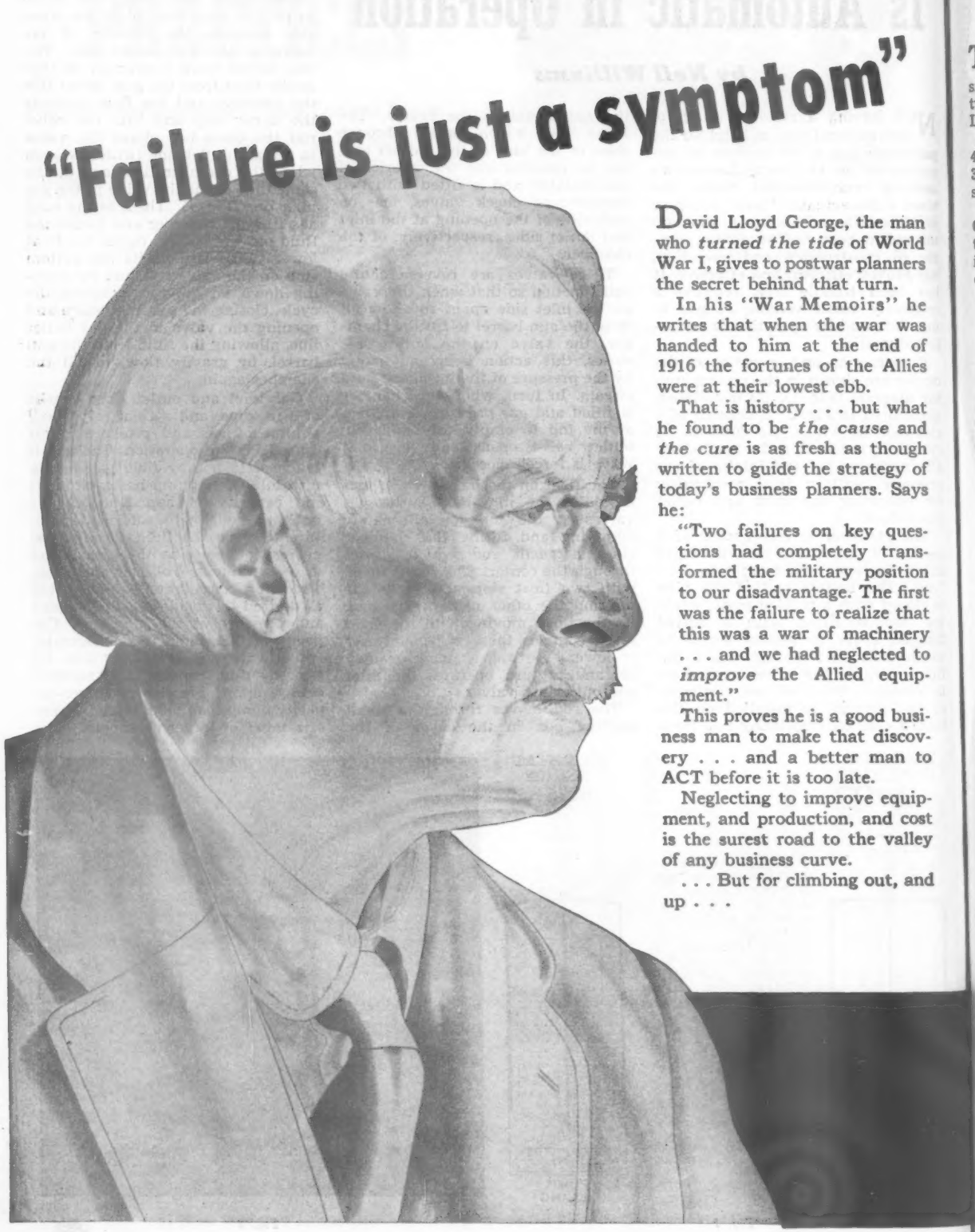


Fig. 1

Fig. 2

then he said to himself

"Failure is just a symptom"



David Lloyd George, the man who *turned the tide* of World War I, gives to postwar planners the secret behind that turn.

In his "War Memoirs" he writes that when the war was handed to him at the end of 1916 the fortunes of the Allies were at their lowest ebb.

That is history . . . but what he found to be *the cause* and *the cure* is as fresh as though written to guide the strategy of today's business planners. Says he:

> "Two failures on key questions had completely transformed the military position to our disadvantage. The first was the failure to realize that this was a war of machinery . . . and we had neglected to *improve* the Allied equipment."

This proves he is a good business man to make that discovery . . . and a better man to ACT before it is too late.

Neglecting to improve equipment, and production, and cost is the surest road to the valley of any business curve.

. . . But for climbing out, and up . . .

ALIGNMENT CHART FOR NATURAL-GAS PIPE LINE OPERATION

Calculating Volume of Gas Lost When Blowing Line Section Through Open End

This is one of a group of several alignment charts prepared by W. D. Parkes, United Gas Pipe Line Co., for the solution of field problems encountered in natural-gas pipe-line operations. The purpose, advantages and procedure of these charts were discussed in an article which appeared in the March 17 issue.

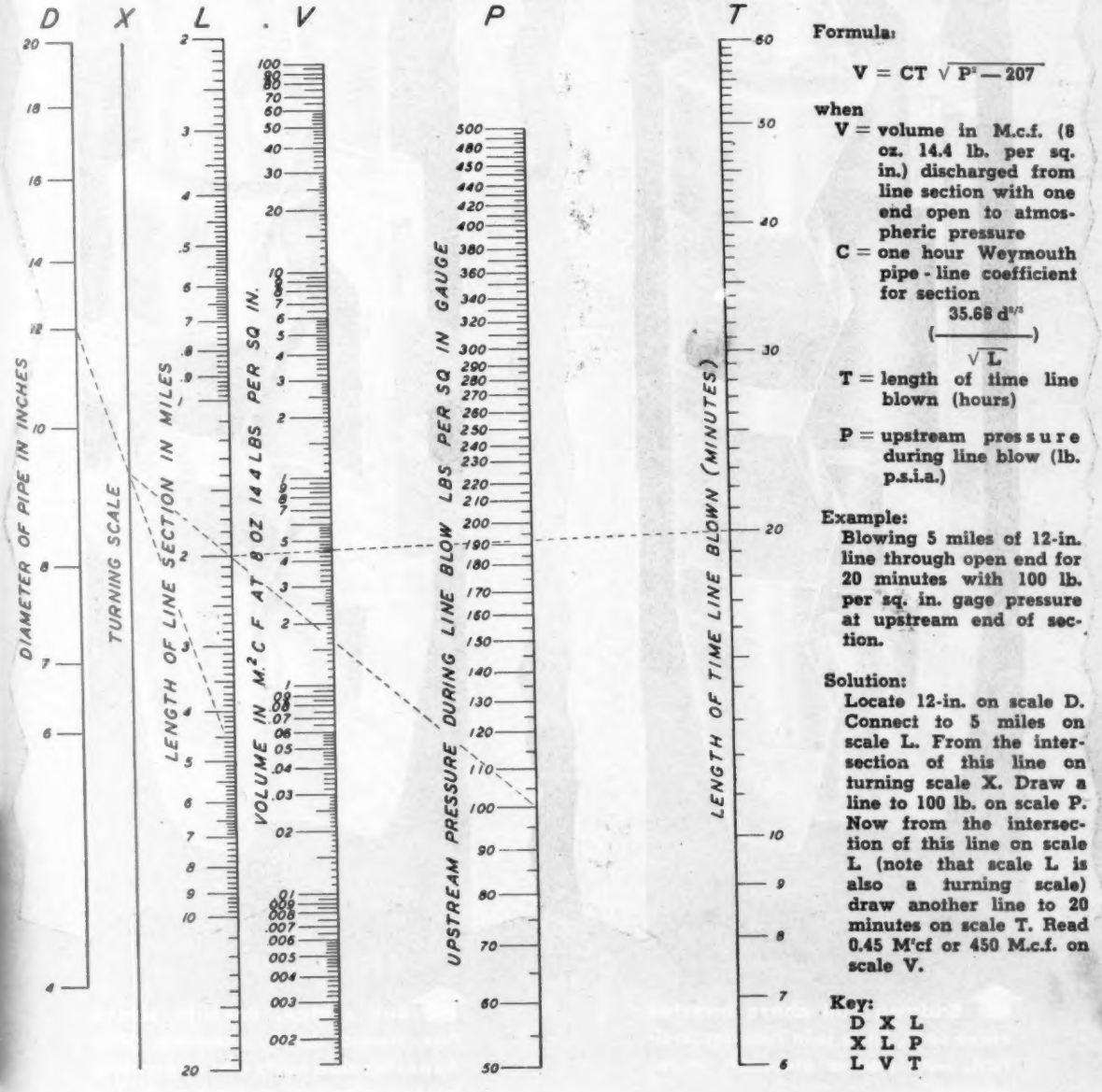
THIS chart solves a formula with five variables. The chart consists of five calibrated scales and two turning scales. Note that scale L is also a turning scale.

Problem: 1—Blowing 7 miles of 4-in. o.d. line through open end for 30 minutes with 155 p.s.i. gage pressure at upstream end of section.

Solution: Locate 4-in. on scale D. Connect to 7 miles on scale L. From the intersection of this line on turning scale X draw a line to 155 lb. on scale P. Now from the intersection of this line on scale L draw line to 30 minutes on scale T. Read 0.045 M³cf or 45 M.c.f. on scale V. Note that the volume scale on this chart is calibrated in M³cf.

Problem: 2—Assuming that it will take 3,000 M.c.f. (3M³cf) to purge 3 miles of 16-in. line with 190 lb. upstream, how much time will be required to purge the line? (Note: This problem is not very practical but is included to show that any variable may be obtained if all the others are known.)

Solution: Draw a line from 16-in. on scale D to 3 miles on scale L. From the intersection of this line with scale X draw another line to 190 lb. on scale P. Note that this line crosses scale L at 0.95. Extend a line from 0.95 on L through 3 M³cf on scale V and on until it intersects scale T. Read 30 minutes on scale T, required to purge line.



Formula:

$$V = CT\sqrt{P^2 - 207}$$

when

V = volume in M.c.f. (8 oz. 14.4 lb. per sq. in.) discharged from line section with one end open to atmospheric pressure

C = one hour Weymouth pipe-line coefficient for section

$$\left(\frac{35.68\ d^{8/3}}{\sqrt{L}}\right)$$

T = length of time line blown (hours)

P = upstream pressure during line blow (lb. p.s.i.a.)

Example:

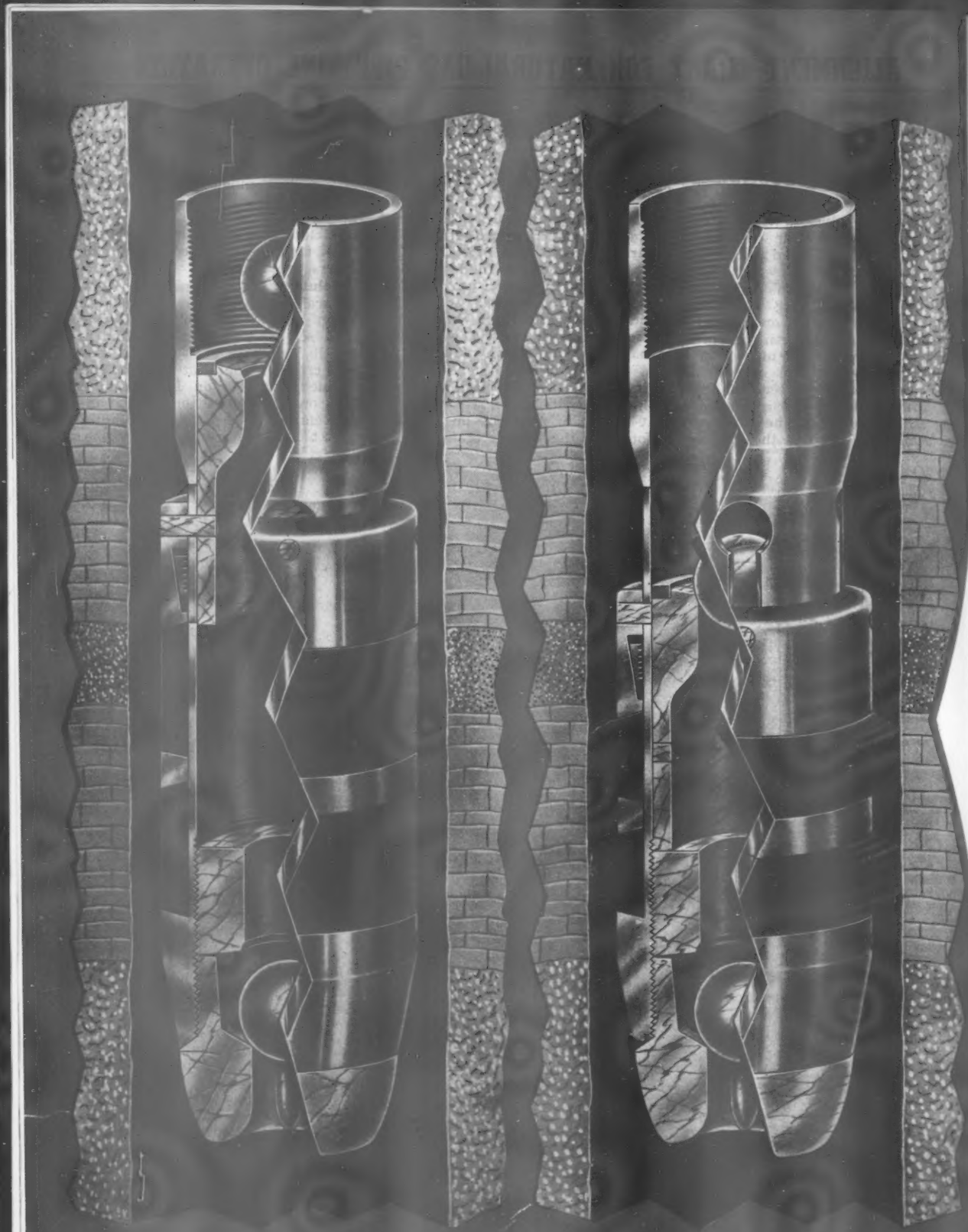
Blowing 5 miles of 12-in. line through open end for 20 minutes with 100 lb. per sq. in. gage pressure at upstream end of section.

Solution:

Locate 12-in. on scale D. Connect to 5 miles on scale L. From the intersection of this line on turning scale X. Draw a line to 100 lb. on scale P. Now from the intersection of this line on scale L (note that scale L is also a turning scale) draw another line to 20 minutes on scale T. Read 0.45 M³cf or 450 M.c.f. on scale V.

Key:

D X L
X L P
L V T



Bridging ball above inverted valve seat. Shoe is in running position, with packer elements unexpanded.

Ball seated, Bakelite sleeve has moved down, shearing pins, exposing side ports and expanding packer elements against wall.

Straight-Run Gasoline Desulfurized Catalytically

by R. B. Tuttle

CATALYTIC desulfurization of straight-run gasoline from Slaughter-pool crude as carried out by Motor Fuels Corp. at its Levelland, Tex., refinery is regarded as an economically outstanding operation. The recently completed unit, a Perco, Inc., process, was erected by Born Engineering Co., Tulsa. Construction was started late in January 1944, and operation of the unit was under way in June 1944.

Designed for a throughput of 2,000 bbl. daily, a wide range in operating flexibility is indicated by the operating reports which show charging rates from as low as 1,000 bbl. per day up to design-capacity rates. Low-rate charges often are carried out prior to changing the unit over from one product to another such as from 80-octane all-purpose gasoline to aviation stock or vice versa.

Flow arrangement of the unit, simplified by omitting secondary and auxiliary lines and equipment, is shown in Fig. 1. The inexpensive construction is comparable to that of a primary distillation unit. The use of corrosion-resistant materials is carried out to about the same extent as is that found in the ordinary topping unit for high-sulfur crudes. The catalyst towers, which are made of carbon steel with ¼-in. corrosion allowance, have a 12-ft. bed of granular bauxite; the towers are designed for working conditions of 50 p.s.i. and 800°F. To expedite the unloading of the catalyst from the towers, the cover of the unloading opening serves in the manner of a large quick-opening valve. Arranged with rollers and a track for supporting the cover plate which operates as the valve disk, the device may be quickly opened or closed against the full load of the catalyst bed.

The heater operates efficiently over an input range of from 3 to 7.5 million B.t.u.'s per hour with gas-fired floor-type burners which are controlled with a temperature recorder controller. Ten conventional-type fractionating plates are installed in the after fractionator and 30 plates of a similar type are installed in the stabilizer column. Accumulators, heat-transfer items, pumps, and the other equipment are of the type normally employed in an ordinary topping unit.

In addition to the temperature recorder controller at the heater four other recorder-controller instruments are incorporated in the unit. Air-actuated liquid-level controllers are used at four different service points, two of which are installed on the accumulators and one each at the bottom of the stabilizer and after-fractionator columns.

Handling Charging Stock

Charging stock is handled by a centrifugal pump with flow rates being controlled by a recording controller. Passing through the tubes of a heat exchanger the charging-stock temperature is increased to approximately 240°F. by the heat picked up from the overhead of the after fractionator. Additional preheating of the charging stock is carried out on the tube side of a second exchanger where the stock from the catalyst towers passes through the exchanger shell on its way to the after fractionator. Coming from the second exchanger at about 550°F. the charging-stock temperature is raised to about 755°F. in the heater. The pressure drop from charging pump to this point runs in the vicinity of 60 p.s.i. and from 3 to 4 p.s.i. through the catalyst towers.

From 5° to 10°F. temperature drop through the catalyst towers represents normal operating conditions which, with the temperature drop through heat exchange, the charged material enters the after fractionator at a 415-425°F. temperature range.

Bottoms from the after fractionator, a naphtha, flow by liquid-level control through a cooler to storage; the liquid-level controller maintains a level in the bottom of the column. Additional heat is put into the liquid in the bottom of the after fractionator by means of an exchanger which is set up in a manner similar to that of the conventional reboiler arrangement. Hot gas oil from a cracking unit is circulated through the exchanger tubes. An approximate heat balance shows that the temperature of the hot gas oil which enters the exchanger at near 625°F. drops in the order of 150°F.

Overhead from the after fractionator is largely condensed in the shell side of the preheat exchanger in the charging stock line. Complete condensing and cooling of the overhead material is carried out in two water-cooled exchangers from which the

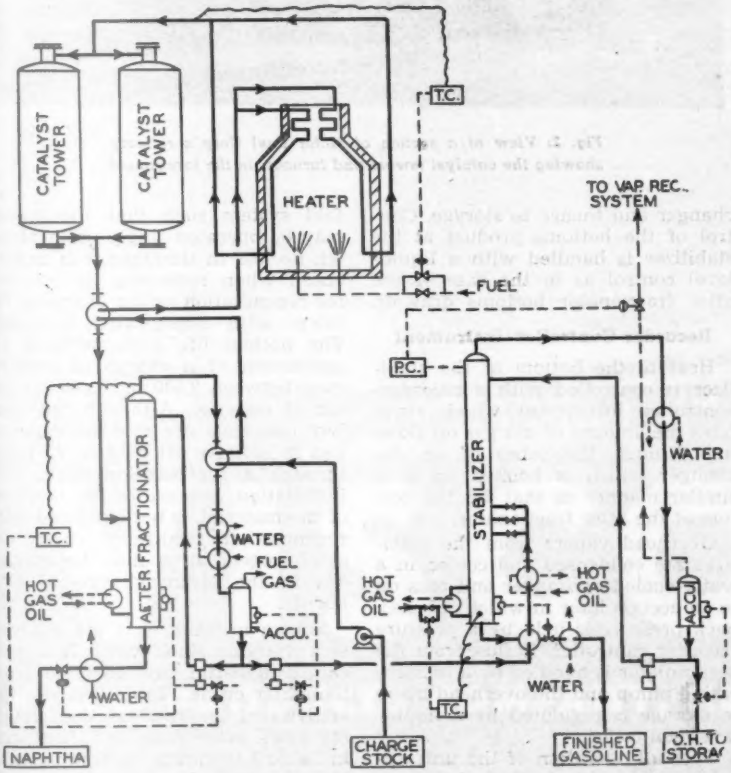


Fig. 1: Diagrammatic flow arrangement of treating unit

condensate is taken to the after fractionator accumulator. From the accumulator, in which a back pressure of 30 p.s.i. is maintained, the condensate is picked up by a reflux pump which is controlled by the top of tower temperature with a recorder controller. Overhead make is picked up from the accumulator by a reciprocating pump which is controlled by a liquid-level control.

The overhead make pump, which discharges at 110 p.s.i., serves as the charge pump to the stabilizer. Before entering the feed section of the stabilizer, the material passes through the tube side of two exchangers. The first of the exchangers has its shell side hooked up to the bottoms line from the stabilizer. Temperature of the feed to the stabilizer after leaving the first exchanger is approximately 175°F. and after leaving the second exchanger is from 180-190°F. Heat to the second exchanger is supplied from an outside-source hot gas oil. Bottoms from the stabilizer, a finished product, is passed through a water-cooled exchanger and thence to storage. Control of the bottoms product at the stabilizer is handled with a liquid-level control as in the case of the after fractionator bottoms drawoff.

TABLE 1—TYPICAL STRAIGHT-RUN RAW GASOLINE

		A.S.T.M. Distillation	
Gravity	57.9	I.B.P.	96°F.
Color	White	5%	135
Dr. Test	Pos.	10	152
Corr.	Neg.	20	180
Sulfur	0.27%	30	202
Reid V. P.	9.1	40	218
Octane Number		50	239
Clear	59.6	60	262
1 cc. TEL	64.6	70	286
2 cc. TEL	66.2	80	314
3 cc. TEL	69.1	90	352
		Max.	384
		Rec.	95.0%
		Res.	1.0
		Loss	4.0

TABLE 2—TYPICAL STRAIGHT-RUN DESULFURIZED GASOLINE

		A.S.T.M. Distillation	
Gravity	56.1	I.B.P.	100°F.
Color	White	5%	134
Dr. Test	Neg.	10	152
Corr.	Neg.	20	176
Sulfur	.014%	30	196
Reid V. P	7.0	40	212
Octane Number		50	224
Clear	60.9	60	258
1 cc. TEL	71.4	70	280
2 cc. TEL	78.7	80	308
3 cc. TEL	81.7	90	344
		Max.	388
		Rec.	97.0%
		Res.	1.2
		Loss	1.8

TABLE 3—TYPICAL STRAIGHT-RUN DESULFURIZED AVIATION STOCK

		A.S.T.M. Distillation	
Gravity	59.8	I.B.P.	104°F.
Color	White	5%	145
Dr. Test	Neg.	10	156
Corr.	Neg.	20	171
Sulfur	.008%	30	182
Reid V. P.	7.0	40	192
Octane Number		50	202
Clear	67.1	60	212
1 cc. TEL	78.3	70	223
2 cc. TEL	84.0	80	238
3 cc. TEL	87.3	90	258
4 cc. TEL	89.5	Max.	291
		Rec.	97.0%
		Res.	1.1
		Loss	1.9

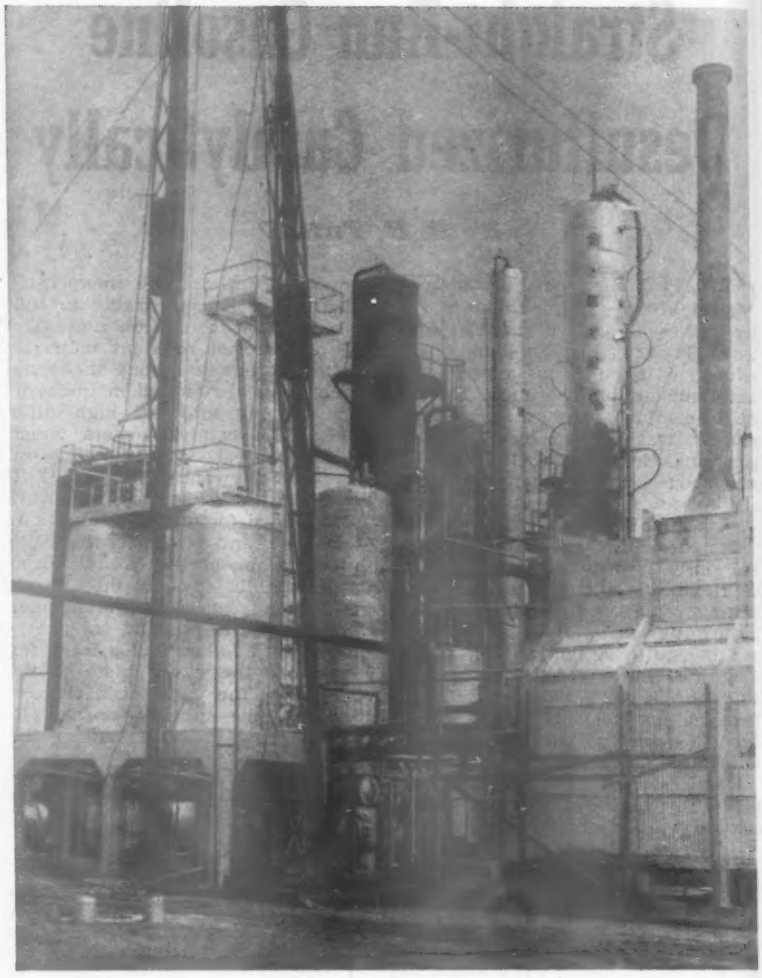


Fig. 2: View of a section of Motor Fuel Corp.'s refinery showing the catalyst towers and furnace, in the foreground

Recorder-Controller Instrument

Heat to the bottom of the stabilizer is controlled with a recorder-controller instrument which regulates the amount of hot gas oil flowing through the tubes of an exchanger which is hooked up in a similar manner as that for the bottom of the after fractionator.

Overhead vapors from the stabilizer are condensed and cooled in a water-cooled exchanger and pass on to an accumulator in which 105-p.s.i. back pressure is held by a pressure recorder controller. Reflux from the accumulator is handled by a reciprocating pump and the overhead make to storage is regulated by a liquid-level controller.

Over-all operation of the unit appears comparable to that of the average topping plant. Having a manifold system such that the towers may be operated singly or in parallel, no loss in throughput is experienced when removing the catalyst for regeneration or for charging the tower with regenerated materials. The normal life cycle without regeneration of a charge of catalyst runs between 2,500 and 3,000 bbl. per ton of material. Although the catalyst materials are said to show no loss in activity after 15 or 20 times through a regeneration cycle, this installation, because of the low cost of the material, is not equipped with regeneration facilities; where desired, regeneration may be carried out in the ordinary type of clay burner.

Shown in Table 1 is the analysis of a charging stock which is a typical straight-run raw gasoline from Slaughter crude. Table 2 shows the analysis of the raw-gasoline charging stock after desulfurization, and in Table 3 is shown the analysis of a typical desulfurized straight-run aviation stock.

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New Gas-Engine Design Reduces Fuel Consumption 25 Per Cent

*by Ralph L. Boyer**

This detailed explanation of the new diesel engine development perfected by the author which makes possible the use of either gas or oil as fuel without any electrical sparking device, outlines the engineering principles by which the new system is applied. It also cites a few of the obvious applications for the new dual-fuel control mechanism.

A NEW development in the diesel engine field, which will enable the engine operator to use either gas or oil as fuel without any electrical sparking device, and which will cut fuel consumption of gas engines by from 20 to 25 per cent, has been revealed by The Cooper-Bessemer Corp., Mount Vernon, Ohio, and Grove City, Pa.

This development is the result of experimentation which began in 1927. Recently, efforts have been rewarded by the successful operation of a natural-gas engine on the diesel principle. This enables the unit to operate on a wide variety of fuels including fuel oil, natural gas, manufactured and coke-oven gases, sewage gas, and refinery by-products.

The conversion from liquid to gas fuel is as simple as the closing of one valve and the opening of another with the engine operating continuously at full load. Although conversion from one fuel to another has been possible in the past, it has always been necessary to shut down and exchange major or minor parts of the engine.

*Chief engineer, The Cooper-Bessemer Corp.

The development leading up to the burning of gas on the diesel cycle can be explained by comparing it with the normal spark-ignited engine operating on what is known as the Otto cycle.

The usual four-cycle gas engine operates on the same general principle as the four-cycle gasoline engine. A mixture of gas and air is made on the intake, the ratio of gas and air being held constant. The quantity of the mixture is varied in accordance with the load demand by throttling the intake. At full load, therefore, the intake manifold is under only a slight vacuum, while at no load it is under a high vacuum. The compression pressure depends upon the load and at full load ranges from about 90 to about 125 p.s.i., depending upon the quality of gas. Ignition is always by means of spark. Two-cycle gaseous-fuel engines operate on the same principle, except that inasmuch as the cylinder is scavenged with air the gas is not put into the cylinder until after the ports are closed. Therefore, on the two-cycle engine the air quantity is constant, while the gas is varied, producing a mixture which is not of constant quality as is evidenced by the fact that the two-cycle engine usually misses a great deal on the lighter loads.

The thermal efficiency of an internal-combustion engine is a function of its compression pressure. For example, a 125-lb. compression engine usually results in about 10,000 B.t.u. per brake horsepower hour, while a 400-lb. compression engine usually produces a brake horsepower hour for about 7,500 B.t.u. It is, therefore, always desirable to keep the compression as high as possible.

Compression Is Limited

On the Otto cycle engine, the compression is limited because of premature ignition and must be held to the point where there is no danger of the mixture being ignited before the proper time. Therefore, the Otto cycle is limited to about 10,000 B.t.u. per brake horsepower hour, or an efficiency of about 25 per cent.

In 1927, Cooper-Bessemer had the idea of burning gas on the diesel cycle. A single-cylinder test engine was built and operated on this cycle in 1928. Since it was not possible to go much beyond 125-lb. compression with the regular line of gas engines, it was assumed that there was no chance of compressing the mixture to 400 lb. for the diesel cycle. It was arranged, therefore, to compress air only and then inject the gas on top dead center under very high pressure. The gas pressure actually used was about 1,000 p.s.i. It was found that while it was possible to run such an engine without any other ignition means, the engine performed very much better if pilot oil injection was also used. The design of this engine and its performance are all a matter of record.

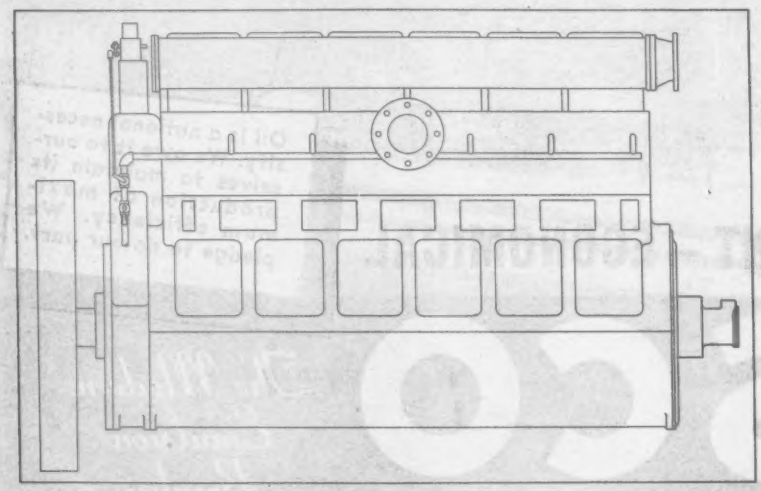


Fig. 1—This diagrammatic line drawing of a diesel engine from the exhaust side shows how the new Cooper-Bessemer dual-fuel development is assembled to the engine. With this new improvement, any engine built as a diesel, can be fitted to operate on gas except spark-ignited gas engines. To convert the oil engine to a gas engine, it is merely necessary to remove the fuel-oil system from the governor, set it to the minimum position and connect the governor to the gas regulating valve. All this is accomplished automatically by the turning of a valve

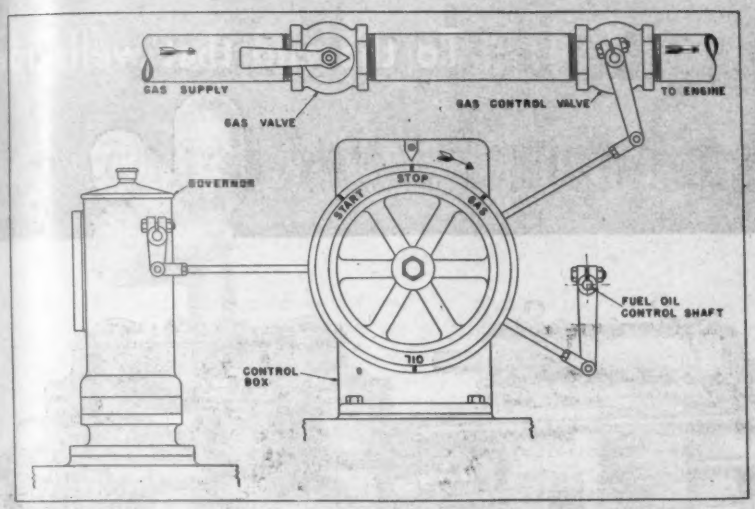


Fig. 2—Here is an enlarged view showing the method by which the controls are utilized to change from use of oil to gas, or vice versa, or even to maintain a mixture of the two where there might be insufficient gas to pull a load. It is possible to arrange it so that the engine automatically goes from one to the other as the gas availability fluctuates. Hundreds of installations at places where the future of the fuel supply is uncertain could solve their operating problem with this new method of control

When the possibility of supplying a high-pressure injection compressor was considered, together with the regular diesel fuel-oil injection means, it was decided that the design would not appeal commercially and, at least for the time being, should not be produced. Since that time at least one other engine builder has taken up this development and has proceeded to build a number of large engines and install them in the field.

As stated above, no thought was given at that time to the possibility of allowing the gas to go in with the intake air, because of the assumption that it would preignite. Actually, it is difficult to get gas to ignite at 400-lb. compression, even if in a perfect mixture ratio, although one cannot be sure it will not ignite.

Reasons for Limitation

Undoubtedly, one reason for the Otto cycle engine being limited so low in compression is the existence of hot spots in the combustion chamber. Theoretically, at least, the temperature of ignition of a perfect mixture of natural gas and air is above the temperature reached with 400-lb. compression. There is, of course, a minimum gas-air ratio below which the mixture is not inflammable under atmospheric conditions, even when ignited with a spark, and also a maximum beyond which it will not ignite. The point that was not considered on the earliest work on burning gas on the diesel cycle was that due to the inherent efficiency of the cycle the amount of gas required is considerably less than with the Otto cycle and the gas-air ratio at full load is still a very lean mixture, not too easily ignited.

It was, therefore, found possible to admit the gas with the engine air intake and still be completely free of any evidence of premature ignition. In fact, on very heavy overloads with natural gas, the mixture will not fire without the pilot oil flame. It is possible to employ electrical ignition with this high compression, but electrical ignition under these conditions is not too reliable and the engine really requires a more positive flame anyway than can be provided electrically. Still further, the desirability of having an engine which can operate on either oil or gas makes the pilot oil ignition attractive.

It is obvious that any engine built as a diesel can be fitted to operate on gas, but of course engines built purely as spark-ignited gas engines cannot be converted to this principle.

Assuming a diesel-oil engine in operation and on load, if gas is admitted in the intake air the governor obviously will immediately reduce the amount of oil to compensate for the percentage being carried by the gas. It then merely becomes necessary to reduce the fuel-oil injection to the desired minimum and then govern the percentage of gas according to load. Such a system is shown diagrammatically in Fig. 1. It is clear that to convert the oil engine to the gas engine it is merely necessary to remove the fuel-oil system from the governor, set it in the minimum position and connect the governor to the gas-regulating valve. This is an extremely simple move and requires not more than a few minutes.

Gas Availability Varies

Normally, a shutdown of a few minutes to make this conversion would not be of any consequence. There are cases where the gas availability varies frequently, as for example, in sewage-disposal plants. There it is desired to be able to instantly change from oil to gas, or vice versa, or even to maintain a mixture of the two where there is insufficient gas to pull the load. To do this obviously requires some form of controls so that the operator can at will change from one fuel to the other, or even arrange it so that the engine automatically goes from one to the other as the gas availability fluctuates. Such controls are illustrated diagrammatically in Fig. 2.

Fig. 3 shows a 675-hp. Cooper-Bessemer diesel engine with the

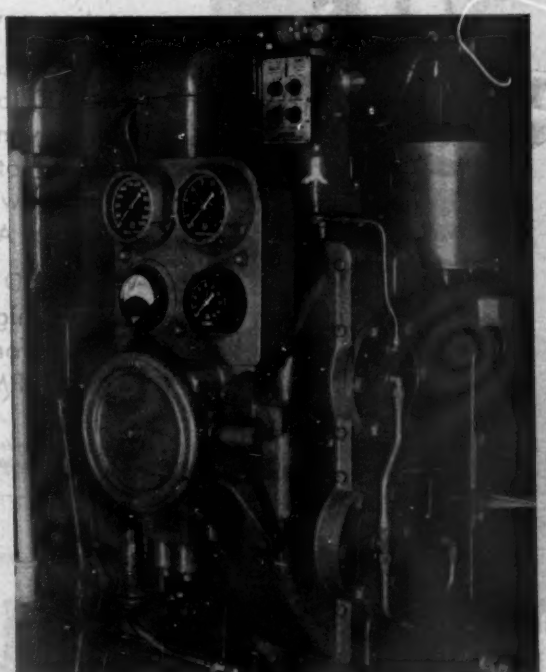
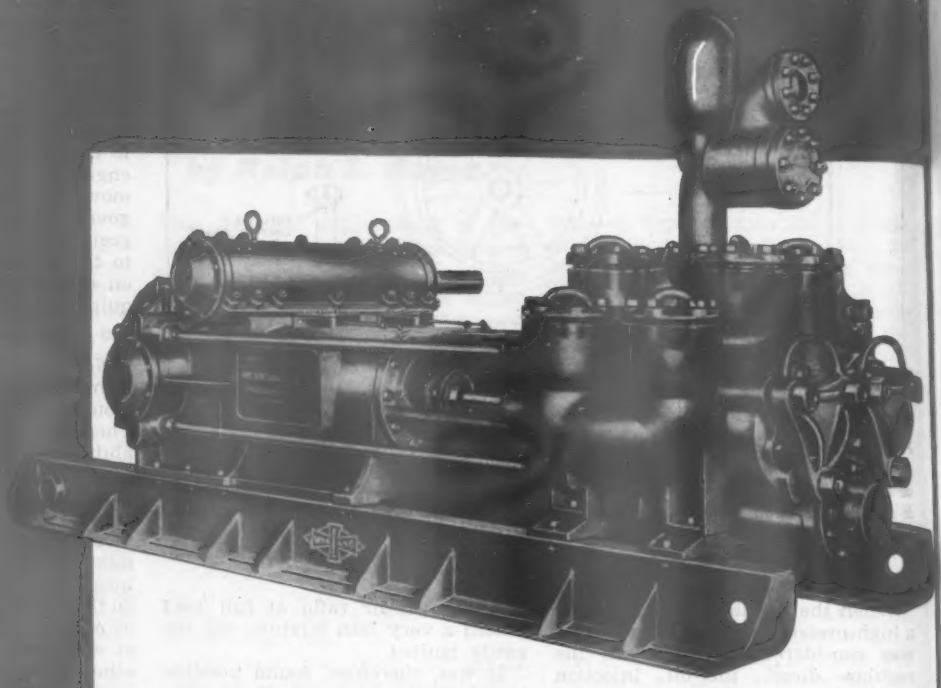


Fig. 3—This view is of the control end of a Cooper-Bessemer Type JS-8 diesel engine showing the gas-oil operating mechanism. This engine is rated 675 hp. at 400 r.p.m.

To the end that wells ma



The WHELAND heavy duty power slush pump shown above (HP-11000-AB 7¼" x 14") is guaranteed to strike a spark of appreciation with any driller who values advanced equipment. Fully enclosed Timken bearings. Tie rods connecting power and fluid ends. Ask for Bulletin No. 168.

The WHELAND swivel illustrated has a safe capacity of 464,300 lbs. at 100 RPM. Spherical swivel body of manganese vanadium steel for maximum strength and minimum weight. Lots of oil space. No glands to adjust, no nuts to fall off. Swivel stem can be removed without disconnecting coupling. As good as it looks. Ask for Bulletin No. 167.

WHELAND builds rotaries for deepest drilling. The popular high speed oil bath model shown below is recommended for wells to 10,000 feet, using 4½" drill stem up to 350 RPM. 20½" table opening. Features so practical you wonder why no one else ever thought of them. Ask for Bulletin No. 169.

gas-oil operating mechanism assembled on the control end.

There are hundreds of installations of diesel engines, or of gas engines, which have been installed as convertible units, because of the uncertainty of the future of the particular fuel they are using. This is particularly true, of course, when installing an engine in a gas field of questionable future. The usual means of convertibility is by change of pistons, or of cylinder heads, or by means of spacers under the cylinder heads which will increase compression space when converting to gas. The conversion then consists of changing from an electrical ignition system to a fuel-oil system or vice versa. The change obviously requires considerable time and involves expensive parts.

Since, in order to make such an engine convertible, it must be designed as a diesel engine anyway, and it is therefore capable of withstanding the pressures of the diesel cycle, it is obvious that the burning of gas on the diesel cycle not only conserves gas, but also provides a very much simplified conversion. Still further, it provides a reconversion to the original fuel at any time. The value of this latter is apparent when considering pipe-line compressor engines for example, since it would be highly advantageous to convert to oil in critical times of gas shortage as have been experienced recently.

Oil-Filtering Unit Is Made From Salvaged Parts

SALVAGED parts largely went into the construction of the oil-filtering unit shown in the photograph. Designed to process lubricating oil which is received direct from a group of engine compressors and to return the filtered oil to the machines for reuse, the control unit requires very little attention from the plant's operating crew.

By means of manifold connections a compressor unit may be made independent of the filtered-oil supply system as desired. When not receiving oil from the central system, a compressor unit operates, without benefit of a filter, on its individual feeding system.

Flow of oil from each compressor to a settling tank in the filtering unit is by gravity. At the settling tank the incoming oil is heated and such water as may have settled out is removed. Heating is done with a submerged pipe coil and water is removed with a small hand pump. Normally the amount of water taken out of the settling tank is negligible and any small quantity that may be contained in the oil after it passes through the settling tank is removed by the filter. During extreme weather conditions, tests for water accumulation in the settling tank are made at hourly intervals by operating the hand pump.

The settling tank, a light-gage sheet-metal vessel is 42 in. in diameter by 54 in. high. The tank is provided with a removable cover and a coil which is made up of 25 ft. of 1-in. pipe. The coil is formed to a 30-in. diameter helix and is located in the lower half of the tank.

Another tank, which is a duplicate of the settler except that it is not equipped with a steam coil or a hand pump, serves as a reservoir for the oil coming from the settler. Placed in the ground to a depth of about 30 in. below the level of the surrounding area the settling and reservoir tanks are interconnected at a point 4 in. below the incoming-oil connection in the settling tank. The inlet for the settler is located 14 in. below its top and the outlet for the reservoir tank is placed near its bottom. Steam and condensate lines for the heating oil in the settler pass through the side walls of the tank near the top. Rigidly attached to the tank's side wall the hand pump, which is a better type of "barrel" pump, passes through an opening in the tank cover. Located on the rim of the cover the opening for the pump allows the cover to be removed without interference from the hand pump.

Emergency Operation

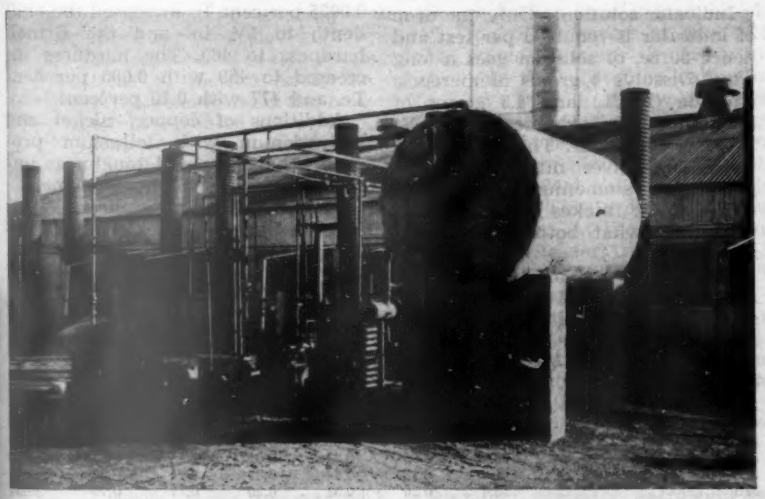
A small reciprocating simplex pump, which is arranged for hand throttling, moves the oil from the reservoir tank to a small tube-and-shell heater, thence to a filter, a cooler, and to a filtered-oil storage tank. For emergency operation an electrically driven pump is tied into the oil piping lines for the steam-driven unit.

Exhaust steam is used for heating at the small shell and tube unit and for the coil in the settling tank. Using standard elements the filter body is plant-shop-made from 10-in. pipe.

The cooler unit, which is made of 2-in. pipe and fittings, is incorporated into the system as a safety measure. However, operating experience to date indicates that cooling at this point is not required.

During extreme winter weather, the oil in the storage tank requires heating to improve its flow to the compressor units. Heating is done with a small pipe loop which is placed near the bottom of the vessel. About 4 in. of insulation on the tank helps to keep down heating costs.

The filtering unit after several years' service shows good returns, according to the superintendent of one of the large oil company's plants where the unit is installed.



Centralized filter unit for engine oil

Art Brown, district superintendent for The California Co. in central Louisiana and Mississippi under loan from Standard Oil Co. of California, has returned to the latter company at San Francisco for special assignment. Prior to the Japanese invasion, Brown was superintendent for Standard of California in the Dutch East Indies.

PROGRESS IN METALS

by W. L. Nelson
Consulting Engineer

Field Welding of Vessels

SOME of the vessels required in modern petroleum-refining processes, notably fluid-catalytic cracking, are so large that they can be shipped only at great expense if they can be shipped at all. Thus, shop fabrication must be and is being supplanted to an increasing degree by field fabrication. Some of these vessels are 50 ft. in diameter.

High standards of shop fabrication have been applied in the field by M. W. Kellogg Co. A five-step program provides specific procedures for: plate-edge preparation, preheating, welding sequence, electrode selection, and stress relieving. After these procedures were field tested to guarantee their soundness, a definite method of control was established.

Under this plan, crews of special field welding inspectors were organized who were responsible for the follow through of the procedure. Operation of the plan brought satisfactory final results in the welding, but in view of the importance of perfection in these vessels, a positive check on the soundness of all welding was essential.

To accomplish this the vessels are examined in place in the field by means of the X-ray (radiographing) and magnaflux methods of examining welds.

"Coupon sampling" and trepanning, familiar methods of examining field welding, failed to provide a satisfactory check, as they did not cover every inch of the welding and the resulting openings in the vessel were very difficult to repair.

Original adaptation by The M. W. Kellogg Co. of radiography equipment for use in field checking of vessel welding

Spot Test for Aluminum And Manganese Bronzes

REPORTS of Investigations of the Bureau of Mines, R. I. 3786, by R. B. Corbett, entitled, "Spot Test for the Separation of Aluminum Bronze from Manganese Bronze," describes a means of separating these bronzes that is quick, accurate, and generally well adapted to plant use.

A small area on the surface is cleaned of all dirt, scale, and grease, by grinding; then this freshly prepared surface is sprayed with an acid solution by means of an atomizer bottle. After the acid has reacted for several seconds, a drop of indicator solution is introduced from a medicine dropper. A grayish purple spot is produced with manganese bronze whereas a greenish yellow spot appears if the alloy is aluminum bronze. The quick appearance of the characteristic color permits many tests to be conducted in an hour.

Acid solution and sprayer.—A 12 normal sulfuric acid solution (1 part H_2SO_4 and 2 parts water by volume) is most satisfactory; a weaker solution intensifies the color of the aluminum bronze spot and a stronger solution intensifies the manganese bronze spot. An all-glass atomizer can be easily made by connecting a rubber pressure bulb to the glass tip of a medicine dropper and mounting the tip directly above a glass capillary tube which extends through a cork into the acid.

Indicator solution.—Only one drop of indicator is required per test and hence 50 cc. of solution goes a long way. Dissolve 4 grams of mercuric chloride ($HgCl_2$) and 4.5 grams of ammonium thiocyanate (NH_4CNS) in 50 cc. of water. The addition of 0.01 gram silver nitrate and 0.75 gram of ammonium persulfate, $(NH_4)_2 \cdot S_2O_8$, makes the indicator work somewhat better but is not necessary.

Typical analyses of aluminum and manganese bronzes which can be sorted by means of this spot test are:

CHEMICAL COMPOSITION, PER CENT

Type—	Cu	Fe	Sn	Mn	Pb	Al	Zn
Al	89.9	0.45	0.08	0.01	0.07	9.18	0.31
Al	88.5	0.47	0.46	0.01	0.05	9.18	1.33
Al	88.9	1.95	0.08	0.02	0.05	8.74	0.36
Al	88.7	0.95	0.21	0.01	0.06	9.65	0.43
Mn	61.6	0.13	0.84	0.05	0.21	0.00	37.16
Mn	58.4	0.59	0.31	0.20	0.17	0.79	39.54
Mn	63.6	0.08	0.06	0.05	0.27	0.48	35.46
Mn	58.5	0.49	0.22	0.12	0.39	1.25	38.94

Tellurium for Hard Surfacing Cast Iron

TELLURIUM is such a potent chill-producing alloying element that very minute additions of it to cast iron will increase the chill depth, hardness and resistance to certain types of chemical attack.

Tellurium additions, such as solid metal or powder, usually range from 0.001 to 0.05 per cent, but since its potency declines with time, it should be added just before pouring. It may also be added by painting or spraying the dry powder to mold-metal interface, or by applying it to a pattern from which it is transferred to the mold surface.

A localized chill can be obtained by coating specific areas of the mold surface with tellurium-bearing washes. With the tellurium content of a mold wash varying from 0.01 gram to 0.05 gram per square inch., the chill depth varied from 1/16 in. to 3/16 in. on an iron containing, percentagewise, 3.20 per cent C, 1.70 per cent Si,, 0.50 per cent Mn., 0.07 per cent S, 0.20 per cent P, and 0.50 per cent Cr.

In a test for resistance to acid attack, Long and Krause reported the following losses in grams after 26 hours' exposure for an untreated, unchilled gray iron and for a tellurium-treated gray iron:

	2% H_2SO_4	2% HCl
Untreated, unchilled	4.16	5.51
Tellurium-treated	3.08	2.29

According to Smalley, an iron containing 3.1 per cent C, 1.2 per cent Si., 0.7 per cent Mn., 0.095 per cent S, and 0.2 per cent P was cast against a metal chill with a resulting depth of ⅜ in. deep and a Brinell hardness of 415. An addition of 0.0025 per cent Te increased the chill depth to 1½ in. and the Brinell hardness to 460. The hardness increased to 469 with 0.005 per cent Te. and 477 with 0.10 per cent.

Additions of copper, nickel and molybdenum with tellurium produce a hardness and toughness unobtainable with tellurium alone.

Use of tellurium is licensed by Battelle Development Corp., Columbus, Ohio.

An abstract: J. S. Crout, Foundry, Vol. 72, Nov. 1944, p. 89. Taken from Metals & Alloys of January 1945.

Engineering Fundamentals No. 178

A FEATURE OF THE OIL AND GAS JOURNAL

Methods of Preventing Capillary Rise and Capillary Spreading of Water in Oil Wells

EFFECT of water penetration into oil sands.—It has been shown in previous articles of this series that water, in a well producing both water and oil, has a tendency to penetrate into the oil sand around the periphery of a well forming cones and irregularly shaped sheaths of excess water. If this condition persists, the amount of water produced in a well may increase markedly. It was shown that some sands containing equal quantities of oil and water, might produce as much as 95 per cent water. How can the penetration of water into sand and increase of the water production be prevented? Obviously, the practical answer is to keep the water away from the face of the oil sand so that it will not rise in the form of a cone or migrate into the sand laterally. Attempts have been made to accomplish this in various ways depending upon the type of reservoir, condition of the oil sand, amount of water in the reservoir, and individual well characteristics. Methods will be discussed in following articles.

Cementing methods of protecting oil sands from water penetration.—The most used and most successful method of reducing water-oil ratios is bottom-hole and "squeeze" cementation of water-bearing portions of the oil sand. In water-drive reservoirs, if the bottom water is cemented off well above the water-oil contact line in an oil sand and the well is produced slowly so that no coning occurs and if no capillary rise takes place, the well will produce low water-oil ratios until the natural rise of water due to oil depletion brings bottom water into the well. If a knowledge of the position of the water-oil contact in the sand indicates that the well is not drilled into water and is producing much water, then a persistent water cone is at once suspected. Under these conditions in many places squeeze-cementing jobs will lower water-oil ratios by reducing vertical permeability and cutting off a portion of the water. In this method it is usual practice to use a thin slurry of cement, force the slurry under a high pressure back into the sand, aiming it at the portion of the sand from which most water is coming, if this can be determined. If not, the lower portion of the open sand section is cemented. Some sands in deep wells will take a surprisingly large amount of cement.

Process of Penetration

Just how the slurry penetrates the water sand has always been an interesting question. Some think that the cement penetrates the sand pores, displacing the water and oil and actually flowing through the fine capillary openings far back into the sand. Others point out that in many places the fine grains of cement are larger than most of the pores in the oil sand, and, therefore, the sand must be somewhat disrupted by the high pressure and the cement squeezed into horizontal crevices formed along bedding planes in oil formation.

An opportunity to study the behavior of cement slurry in porous rocks has been gained by observing the grouting of dam sites by water engineers. In order to prevent the subsurface leaking of water from a reservoir beneath a dam, it is customary to squeeze cement drill holes placed about 50 ft. apart along the whole length of the dam site and to reduce porosity. This process is known as grouting. At the Possum Kingdom dam site for the Shephard reservoir in Palo Pinto County, Texas, holes were drilled 50 ft. deep through a 20-ft. thickness of rather coarse-grained, cross-bedded, semi-consolidated sandstone of Pennsylvanian age. As much cement was used as the holes would take under a predetermined pressure ranging from 50 to 100 p.s.i.

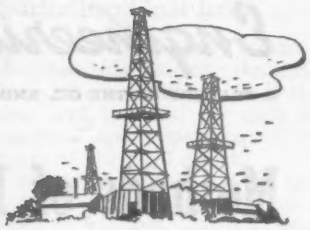
The cement traveled horizontally through the sand and in some places actually came out along the exposed face of the sand in a cliff along the gorge of the Brazos River from 1,000 to 1,300 ft. from the location of the hole. Later, core holes were drilled through the sand at localities halfway between the original grouted holes, and one could observe from the cores as well as from the cliff face the distribution of the cement in the sand. The cement did not flow evenly through the sand layer but irregularly through certain channels or more porous spots and layers near the top of the sand. It perhaps could best be described as extending out from the hole in the form of stringers and thin sills so that there would be in the cores a layer of shale, a thin layer of cemented sand, then a thick layer of uncemented sand.

Furthermore, the layers of cemented sand were very uneven in thickness. In many places stringers of cemented sand would extend out from the main layer or channel of cemented sand and suddenly end, as if the cement slurry started in one direction, found too much resistance, and then took another course. It appeared as if the openings between sand grains near the top of the sand were enlarged by compressing the shale above or squeezing sand up into the less competent materials.

Hence, squeeze cementing in oil wells, in some places at least, probably forms more or less thin layers of cemented sand which effectively cut off vertical migration around the periphery of a well. In other places all the cement may be driven in only one direction from the side of a well. However, after the cement has set, a second or even a third squeeze will force the cement out in other directions. In grouting it is the practice to force the cement in by stages until it has penetrated all sides.

Series prepared by F. B. Plummer, professor, petroleum engineering school, University of Texas

OIL



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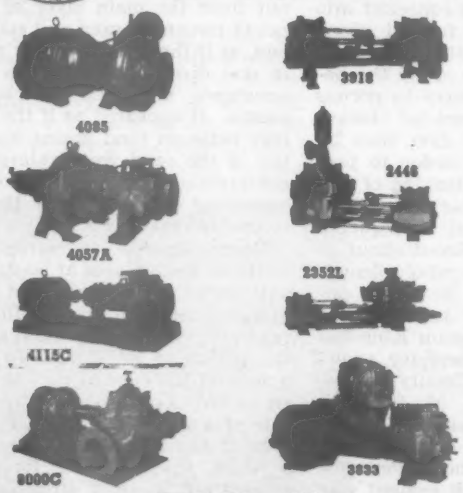

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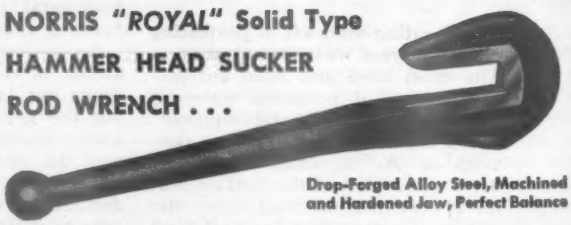

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The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Topping-Plant Design

IN designing a topping system the following general procedure is followed. The numbers used in the tabulation are also used on the topping-plant diagram on this page. The symbols used to indicate equipments were listed in The Refiner's Notebook No. 21.

1. Crude-oil analysis.—A distillation curve (The Refiner's Notebook No. 24), suitable evaluation curves (No. 26), and corrosion analyses (No. 32) will provide adequate general information.

2. Marketable products.—The data of Item 1 permits estimation of the general physical characteristics of the products. Refer to Nos. 9, 11, 13, 15, 17 and 20 about the different types of common crude oils.

3. Yields.—These may be determined by the methods of No. 26 and the economics of the venture may be judged by the costs given in No. 27.

4. Vaporizer temperature.—The flash temperature to vaporize the total products of Item 3 can be determined by drawing the flash vaporization curve (Nos. 34 and 37).

5. Steam or vacuum.—If the flash temperature is so high that it will cause decomposition (over 700° F.) or discoloration, steam is used to reduce the vaporizer temperature (Nos. 38 and 39). Steam is adequate for reducing the vaporizer temperature except for extremely high-boiling crude oils (No. 28) which may require the use of a vacuum as well as steam.

6. Tower.—The fractionating tower is designed next because the temperatures of the various sidestream products must be known in order to design the steam strippers and the heat-exchange system.

7. Strippers.—Steam is usually required to obtain proper initial boiling points and flash points on the products. This further reduces the temperatures of the sidestream products before they enter the exchangers.

8. Reflux.—The amount of external or pump-around reflux must be computed in order to know the volume of material that passes through the condenser exchangers.

9. Settlers.—The temperature required for proper settling (No. 30) of the crude oil is determined and this temperature is attained by using several or all of the condenser exchangers.

10. Heat exchange.—The economy of heat exchange is investigated and the optimum amount of heat exchange for maximum economy is installed.

1. Pipe still.—The exchanger outlet temperature, amount of vaporization (Item 3 above), and the vaporizer temperature (Item 4 above), permit design of the pipe still.

12. Miscellaneous.—Numerous details of the design such as pipe sizes, pumps, steam consumption, water coolers, etc., can be completed in almost any order.

The program of design has been discussed down to about Item 3 in previous issues of The Refiner's Notebook but most of the other details will be presented in future pages. Inasmuch as the same quantities are used over and over again in the design work, time is saved by making a complete tabulation of quantities, pounds, molecular weight, latent heat, etc., before starting work.

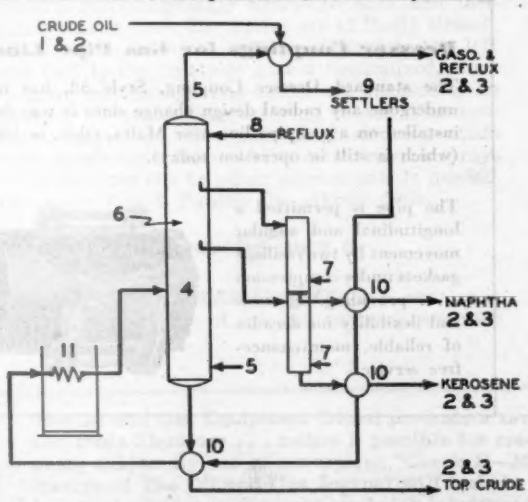


Fig. 1—Organization of topping-plant design

TENTATIVE SCHEDULE OF TOPICS

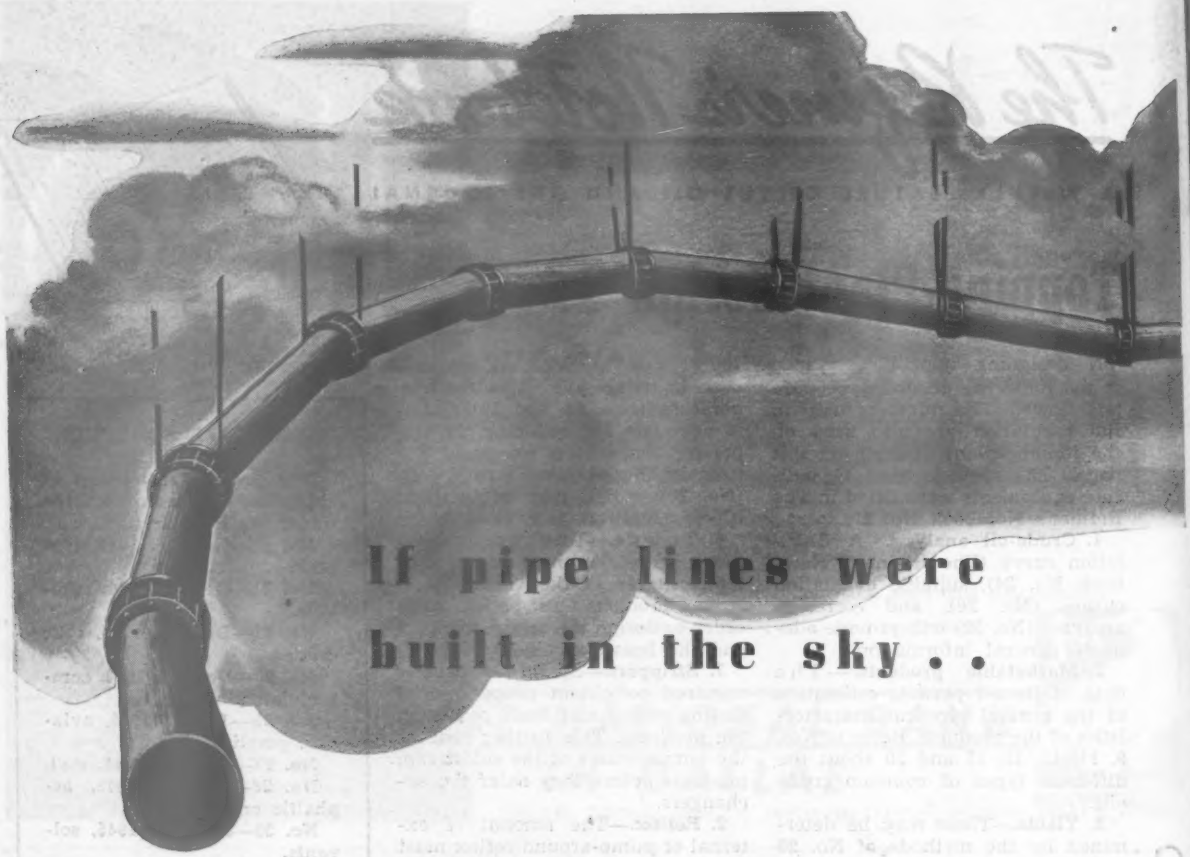
The process of topping or skimming has been discussed under the following titles:

No. 19—Nov. 25, 1944, topping.
No. 21—Dec. 9, 1944, symbols.
No. 22—Dec. 16, 1944, sour crudes.
No. 23—Dec. 23, 1944, combination plants.
No. 25—Jan. 6, 1945, aviation gasoline.
No. 27—Jan. 27, 1945, cost.
No. 28—Feb. 3, 1945, asphaltic crudes.
No. 33—Mar. 10, 1945, solvents.
No. 35—This issue, design.

The following schedule is now in process:

No. 31—Yields from crude oil.
No. 32—Laboratory corrosion control.
No. 33—Solvent manufacture.
No. 34—Flash vaporization.
No. 35—Topping design.
No. 36—Sulfur analysis.
No. 37—True vapor phase and flash curves.
No. 38—Boiling point vs. pressure.
No. 39—Vaporizer steam.
No. 40—Specific heat (liquids).

No. 35 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa



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Dresser Manufacturing Division, Dresser Industries, Inc., Bradford, Pa.; Houston Office and Warehouse, 1121 Rothwell Street, Sec. 16, Houston, Texas; in Canada: Dresser Manufacturing Company, Ltd., 69 Front Street, West, Toronto, Ontario.

Dresser Couplings for Gas Pipe Lines

The standard Dresser Coupling, Style 38, has not undergone any radical design change since it was first installed on a gas pipe line near Malta, Ohio, in 1891 (which is still in operation today).

The pipe is permitted a longitudinal and angular movement by two resilient gaskets under compression . . . providing tightness and flexibility for decades of reliable, maintenance-free service.

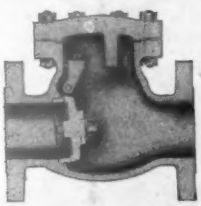
DRESSER COUPLINGS for Plain-End Pipe

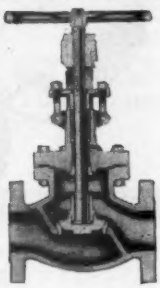
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by Kenneth B. Barnes

(1) CAST STEEL GLOBE AND ANGLE VALVES AND CHECKS are announced in a completely new line. An essential feature of the new valves is that they may be equipped with either spheri-





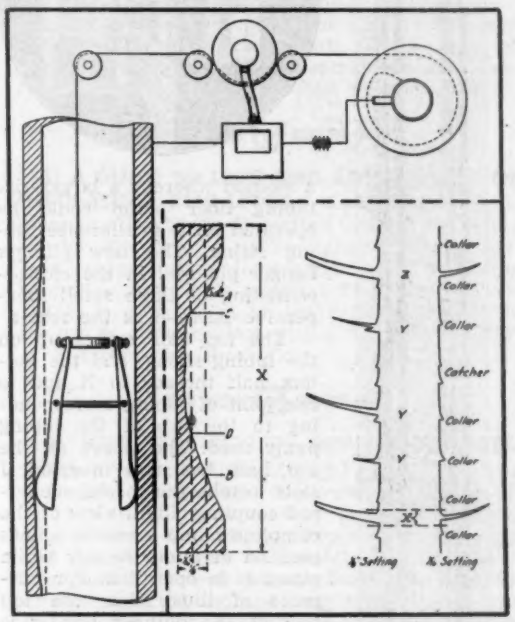
cal or plug-type disks and seats, thus making them adaptable as desired to fluid control in either full-flow or throttling-type service. The check is of full-way design, in which the disk completely clears the fluid passage in the wide-open position. The complete disk assembly is suspended from brackets inside the body, is removable as a unit through the cap opening. *The Ohio Injector Co., Wadsworth, Ohio.*

IT'S NEW CHECK IT

(2) BELTS HAVING CARCASS OF STEEL CABLES instead of cord or fabric, have been developed especially for driving use on postwar machinery and equipment. Reported practically stretchless and shrinkless, the higher load-carrying rating permits correspondingly narrower belts and face pulleys to be used. The cables are of finely stranded, high tensile wire—half are twisted to the left and half to the right—to give a neutralized, true-running installation. The cables are encased in an envelop of nonloading carrying fabric. The new belts, known as "Compass 250," also are made with synthetic rubber where resistance to sprays of lubricating oils or other deteriorants is needed. *Goodyear Tire & Rubber Co., Akron, Ohio.*

IT'S NEW CHECK IT

(3) DIA-LOY TUBULAR SURVEY is a new service whereby effects of internal wear or corrosion



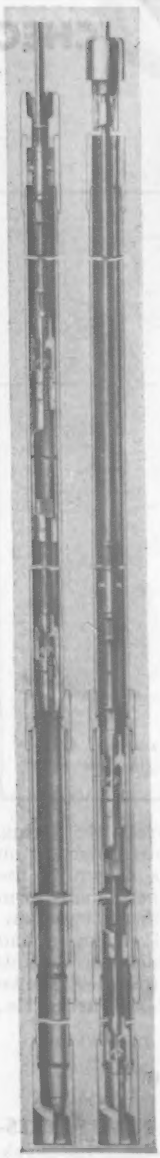
can be quickly located and measured. For tubing, casing, or other pipe surveys either in place or on racks, operating principle used is shown in the illustration. Data are obtained in permanent form on an automatic recorder, in the form of remaining wall thickness. In the record shown, a bad spot is illustrated at point *X*, which corresponds to the eroded portion of the wall thickness shown in the cross-section. *Dia-Loy Tubing Survey Co., Whittier, Calif.*

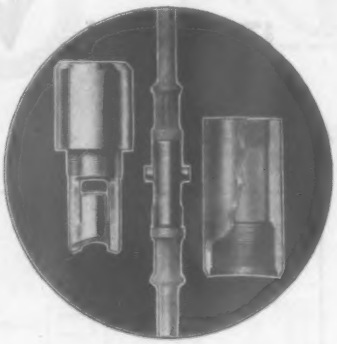
IT'S NEW CHECK IT

(4) PLUNGER HANGER—NEW PUMP ACCESSORY has an interesting story behind its development. Well potentials obtained from the recent Elk Hills drilling campaign were greater than anticipated—and tubing sizes larger than 3-in. were not available. At the direct request of the U. S. Navy, research was started to develop

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear out Card. Check It. Mail It





a method whereby a larger-size tubing liner pump could be operated on a smaller-size tubing string. The new plunger hanger pictured in the circle—consisting of three small inexpensive parts—was the result.

The top half makes up on the tubing string, and the bottom half threads to it and to one joint of tubing corresponding to the size of the tubing pump used. The sleeve on the top half has two inverted J slots to take the special sucker-rod coupling. Right view of the complete pump assembly shows position of pump hanger while pump is in operation. For purposes of illustration, the top half of the plunger hanger is shown separated from the lower half.

In pulling the pump, the plunger is lowered to pick up the standing valve, then raised from the pump liner column into the upper larger-size joint of tubing. Here, the oil is permitted to drain around the special rod coupling, and the J slot serves as a backup or clutch in disengaging the rod string. The left view shows the pump at this point, withdrawn into the upper joint of large tubing.

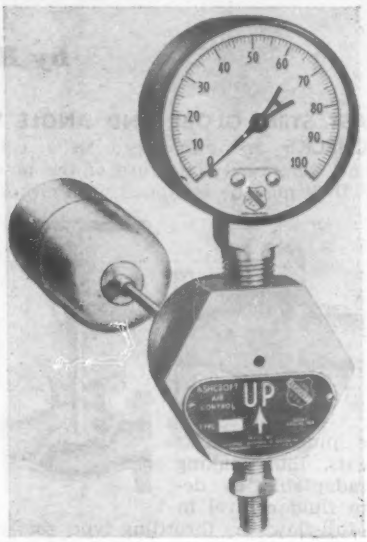
Results: Permits use of larger-size pump on smaller-size string of tubing, with the pulling procedure "dry" instead of "wet." Also, some operators already favor use of the plunger hanger with a pump when using normal-size tubing. *D. + B. Division, Emsco Derrick & Equipment Co., Los Angeles, Calif.*

IT'S NEW CHECK IT

(5) WATER TREATING ENGINEERS. Acting as water consultants, and suppliers of proper chemicals, this company offers a field service for the analysis and control of scale, algae, and other harmful actions of industrial and domestic waters. Now available for drilling rigs, refineries, pipe-line stations, gasoline plants, oil camps, or other places where water troubles may be prevalent. *Solvent Manufacturing Co., Inc., Tulsa, Okla.*

IT'S NEW CHECK IT

(6) LIQUID LEVEL-PRESSURE CONTROLLER is built together as one unit to serve as an automatic float-controlled valve. Valve opens with rising liquid level. Many applications possible



in connection with intermittent or continuous handling of liquids with air or gas pressure, level control, etc. *Manning, Maxwell & Moore, Inc., Bridgeport, Conn.*

IT'S NEW CHECK IT

(7) PORTABLE TANK HEATERS that can be handled by one man are now available for immersion heating of viscous contents of tank cars, tank trucks, settling tanks, etc. Employing the resistance-welded, integrally bonded fin-tube construction which yields high heat-exchange efficiency with low weight, the design is unitized with inlet and outlet steam-line connections and cross-handles for positioning and blocking at various depths. The heaters greatly speed the emptying of heavy materials from tank cars and tanks not fitted with steam coils. *Brown Fintube Co., Elyria, Ohio.*

IT'S NEW CHECK IT

(8) PLASTI-GOGGLES bring the famed Plexiglas from the aircraft production lines to a one-piece item to industry's needs for eye protection. Plexiglas has the same optical qualities as fine optical

glass—and in the plasti-goggle unit the area of sight is not restricted by corners or sharp bends. No rivets, angles or bars interfere with vision. The arch construction plus the inherent qualities of Plexiglas give impact resistance far greater than hardened glass. Spatter-proof, they will not crack or discolor; hot sparks bounce from the surface without leaving pit marks. *Eastern Equipment Co., Inc., Willow Grove, Pa.*

TRADE LITERATURE

(9) REFINERY CASTINGS. Folders available showing manufacturing procedure, heat treating and testing done to establish "internal integrity of the steel." Includes pictorial reviews of casting manufacture under rigid metallurgical control. *Sivyer Steel Casting Co.*

IT'S NEW CHECK IT

(10) GUIDE TO CORRECT INSTRUMENT SELECTION, a profusely illustrated booklet designed to assist industrial instrument users to determine easily which instruments are suited to their particular requirements. Bulletin is easy to use, being divided according to type of instruments, i.e., temperature, pressure, rate of flow, liquid level, force, position, time cycle, and humidity. *Taylor Instrument Co.*

IT'S NEW CHECK IT

(11) OIL REFINING. The development of oil refining from an elementary physical operation a generation or so ago to its present scientific status as one of the major chemical industries of the world, is dramatically described and illustrated in this new book. A chronological review of the subject. *The M. W. Kellogg Co.*

IT'S NEW CHECK IT

(12) PIPE HANGERS OF ALL TYPES, a catalog describing stock items as well as service for fabricating special hangers. Pipe Clamps, adjustable clevis hangers, pipe roller hangers, pipe saddles, pipe-saddle supports, and a full line of brackets, spreaders, and bolts are included. *Elcen Metal Products Co.*

IT'S NEW CHECK IT

(13) PIPE AND BOLT THREADING MACHINES. A very complete catalog covering full line of portable and floor-type threading machines. Well

illustrated, and very complete in description of threading machines for every purpose. *The Oster Manufacturing Co.*

IT'S NEW CHECK IT

(14) CLEANING MATERIALS. A valuable booklet describing 71 different essential cleaning, descaling, and related maintenance jobs commonly performed in industrial plants, by the use of proper cleaning materials. Descriptions and illustrations given in detail. *Oakite Products, Inc.*

IT'S NEW CHECK IT

(15) A GUIDE TO USES AND ADVANTAGES OF INSULATING REFRACTORY CASTABLE. A well-planned attractively illustrated booklet describing the advantages of a light-weight refractory castable, incorporating light-weight and insulating properties in a single material. The product Kast-O-Lite is proposed as an insulation plus castable for use in direct contact with a flame to 2,500° F. *A. P. Green Fire Brick Co.*

IT'S NEW CHECK IT

(16) KVG GAS-ENGINE-DRIVEN COMPRESSORS. An attractive catalog describing these four-cycle V-angle-type compressors, recently offered to fulfill the demand for larger compressors of this type for refining, repressuring, cycling, and gas distribution. A complete and instructive book, listing basic features, advantages, two-page cross-sections of end and longitudinal views, and full specifications. Available in five models, ranging from 600 to 1,000 hp. *Ingersoll-Rand Co.*

IT'S NEW CHECK IT

(17) ELECTRICAL EQUIPMENT. Four new bulletins are available describing products of the electric power department of Elliott Co. One bulletin liberally describes and illustrates the new Bowes drive, an electrical service for reducing speed between modern high-speed prime movers and drive shafts for mechanical applications. Other bulletins describe low-speed AC generators, and low-speed synchronous motors. Prepared in easy-to-file form, in order that this comprehensive reference material may be preserved. *Elliott Co.*

IT'S NEW CHECK IT

(18) SHAFT COUPLINGS. A new eight-page illustrated booklet, giving sizes, dimensions and list prices for flexible, rigid flanged face and compression-type coupling, with special emphasis on the Type "RC" roller chain coupling. *Link-Belt Co.*

IT'S NEW CHECK IT

(19) GLASS TANKS, for hot acids and other hard-to-handle solutions. These tanks stand an instantaneous temperature shock of 400° F. and continuous working temperature of from 500° to 600°. Also, capable of resisting great impact. Fully described in new folder. *Pittsburgh Plate Glass Co.*

W. W. TROUT

L. A. LITTLE

E. P. TROUT

A. E. CUDLIPP

E. F. NELSON

W. H. SMITH

MEN IN THE NEWS

At the annual meeting of stockholders and directors of Lufkin Foundry & Machine Co., **Walter W. Trout** was named vice president and general manager; **L. A. Little**, vice president in charge of sales, and **E. H. Bounds**, treasurer. **E. P. Trout** and **L. A. Little** were added to the list of vice presidents. **A. E. Cudlipp**, vice president in charge of purchases and the Industrial Supply Division, and **Jacque Wiener**, of Shreveport, La., were added to the board of directors. Other directors are **W. C. Trout**, president; **J. H. Kurth, Jr.**, vice president; **E. L. Kurth, W. W. Trout, L. A. Little** and **S. W. Henderson, Jr. W. C. Trout** will act in the capacity of president, a position he had held for many years.

Arthur R. C. Markl has been named chief research engineer for Tube Turns, Louisville, Ky. Before joining Tube Turns, Markl was for 14 years associated with M. W. Kellogg Co., New York, last in charge of the development of equipment for oil refineries.

Wickwire Spencer Steel Co. has announced appointment of **A. S. Rairden** as sales manager of the company's wire rope division. Rairden was previously with Carnegie Illinois, American Steel and Wire, and American Chain and Cable. He was also associated with Wickwire Spencer for 10 years as sales engineer and wire rope sales manager.

Hanlon-Waters, Tulsa, and McAlear Manufacturing Co., Chicago, have integrated their operations and will conduct business as the Automatic Control Division of Climax Industries, of which Climax Engineering Co. is also a division. The three companies, affiliated for the past year, have heretofore operated as separate businesses. General management, sales and engineering are also being centered under single heads in charge of these executive functions for McAlear and Hanlon-Waters plants. **Edward F. Deacon**, Climax president, has announced the following new appointments: **L. J. Griffey**, vice president and general manager; **M. C. Waterman**, vice president in charge of engineering; **C. W. Snyder**, vice president in charge of sales. The two plants and all Hanlon-Waters branch offices and warehouses in the Mid-Continent oil field are being continued. In other territories sales will be handled through distributors. Export sales will be handled by General International, Chicago. Climax and McAlear tradenames will designate all products in the future.

Edwin F. Nelson, head of the engineering and development department of Universal Oil Products Co., has been elected a vice president. Nelson joined the Universal organization in 1926. When the commercial development department was established in the early 30's, he was placed at its head. In 1938 the engineering and development departments were combined under his leadership.

W. H. Smith has been appointed assistant sales manager of Hunt Tool Co., Houston, Tex. He comes to Houston from Casper, Wyo., where he has represented Reed Roller Bit Co. as division manager for the past 6 years. In his new connection with Hunt he again serves under **W. J. "Bill" Hutto** who resigned as sales manager of Reed in 1944 to become vice president and sales manager of Hunt Tool Co.

W. B. Holton, Jr., president of Walworth Co., New York City, manufacturers of valves and fittings, has been elected president of The Valve Manufacturers Association. Since March 9, 1943, Holton has been production consultant and head of the valve and fittings industry for War Production Board. Holton succeeds **Ernest Cochran**, vice president of Chapman Valve Manufacturing Co., Indian Orchard, Mass. The following officers also were elected: Vice president: **Lucien W. Moore**, manager, valve and fitting department, Crane Co., Chicago; **J. P. Ferguson**, sales manager, Reading-Pratt & Cady division, American Chain & Cable Co., Reading, Pa.; **C. W. Burrage**, secretary, Lunkenheimer Co., Cincinnati, Ohio, secretary-treasurer; **George A. Cooper**, New York City. Directors: **C. C. Chamberlain**, sales manager, Jenkins Bros., Bridgeport, Conn.; **Oliver F. Gang**, vice president, William Powell Co., Cincinnati, Ohio; **C. W. Watson**, vice president, Detroit Brass & Malleable Co., Detroit, Mich.; **Hugh Foster**, assistant sales manager, Darling Valve & Manufacturing Co., Williamsport, Pa.; **W. F. Crawford**, president, The Edward Valve & Manufacturing Co., Inc., Chicago, Ill., and **Ernest Cochran**.

Schlumberger Surenco, S. A., Apartado 1608, Caracas, Venezuela, which operates the Schlumberger services in Venezuela, Colombia, Ecuador, Trinidad, Cuba, and Hispanola, announces the election of two new officers: **E. Souchon** becomes vice president in charge of operations, and **Andre J. Stoll** is secretary and treasurer.

L. J. GRIFFEY

M. C. WATERMAN

C. W. SNYDER

W. B. HOLTON

E. SOUCHON

ANDRE J. STOLL

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Natural Gas

Kansas Protests Against Withdrawal of Its Gas

TOPEKA. — Kansas Corporation Commission has gone on record as opposed to the practice of "siphoning off" natural gas from the Hugoton field to be sold in the East at low prices.

"We want the big pipe-line companies to quit exploiting us and give us a decent market," Commission Chairman Richard B. McEntire said.

He reported the commission had intervened in a case pending before Federal Power Commission, which is considering an application by the Panhandle Eastern Pipeline Co. to enlarge its lines from the Hugoton field of Kansas and Oklahoma to markets in Ohio, Michigan and other eastern states.

"We're about at the point," McEntire said, "where as great a volume of gas is leaving the state as we are justified in exporting under prevailing market conditions."

He said Kansas, Oklahoma, Nebraska, western Missouri and eastern Colorado should be able to use the gas for the development of their own territory.

Long pipe lines as now engineered and operated, McEntire explained, "are a restraining influence on the price" of Hugoton gas. He cited this statement from the commission's intervening petition:

"Any transmission line which is so economically constructed as to make its operation dependent upon selling a major portion of its product for boiler fuel in competition with coal or water power, in coal or water power areas, is a definite shackle, we believe, upon the possibility of ever obtaining a fair price for the product."

Bill Would Allow Fixing Of Natural-Gas Prices

OKLAHOMA CITY. — Under the provisions of a bill introduced in the Oklahoma House of Representatives the State Corporation Commission would be authorized to determine the "intrinsic value" of natural gas at the well head and to fix such prices as would prevent "economic waste."

The bill provides that in addition to the accepted terms of waste, the "sale and purchase of natural gas at a price below its intrinsic value shall constitute economic waste," and same shall be prohibited. The commission would determine the prices "in all of the wells and pools" within the state.

Bill Revises Regulation of Natural Gas in Kansas

TOPEKA.—A bill conferring upon the State Corporation Commission broad new powers in regulation of natural-gas production has received preliminary approval in the Kansas Senate. Sen. Richard C. Woodward, of El Dorado, who steered the measure through committee of the whole, said a strengthened state law was necessary to prevent the Federal Power Commission from taking over natural-gas regulation.

Gov. Andrew Schoeppel, chairman of Interstate Oil Compact Commission, said the bill was in line with similar legislation pending in other gas-producing states. Primary aim, he explained, is to "give the state the power to prevent waste of one of our most valuable natural resources" in the Hugoton natural gas field of Kansas and Oklahoma.

Under one section of the proposed Kansas gas act, the corporation commission could take the use of natural gas into consideration in regulating production. Thus, Woodward told the senate, wasteful channel iron methods of producing carbon black could be banned.

Before advancing the bill to the final voting stage without opposition, the senate amended it to eliminate the necessity for obtaining a permit to drill a new gas well.

Odessa Carbon-Black Plant Waits for DPC Approval

WASHINGTON.—Approval by Defense Plant Corp. of financial arrangements is all that is necessary before work can be started on construction of a $1,423,000 carbon-black plant at Odessa, Tex., under the emergency synthetic-rubber program. War Production Board has recommended the project. The plant is to be built and operated by United Carbon Co., Inc., for DPC.

The new plant, for manufacture of channel carbon black, may be operated as part of, or in conjunction with, a new $600,000 installation of United Carbon in the Midland-Odessa area, it was said.

Commission Sets Allowable In Two Texas Gas Fields

AUSTIN. — Daily allowables of 20,000,000 cu. ft. of natural gas in the Agua Dulce field, Dabney sand, and 44,590,355 in the Rodessa field have been set for March by the Texas Railroad Commission.

New rules for the Henderson field, Rusk County, provide 933-ft. spacing between wells and 467 ft. from property lines; 40-acre proration units; and allowables based 75 per cent upon acreage and 25 per cent upon wells.

An amended order calls for gas-oil ratio tests in the Manvel Miocene and Manvel Oligocene pools, Brazoria County, in February, March and April.

Carbon-Black Industry to Get "Every Assistance"

WASHINGTON. — New facilities to produce additional carbon black are being rushed into production and the carbon-black industry is being given "every possible assistance to increase its output from existing plants," Chairman J. A. Krug, of War Production Board, announced last week.

Carbon black is now the limiting factor in tire production, and the revised production schedule for the second quarter of this year is based on the probable quantity of carbon black which will be available.

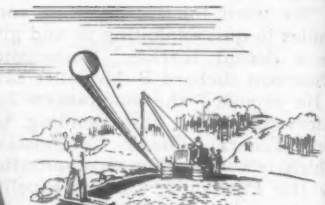
Defense Plant Corp. announced three commitments to finance additional carbon-black plants which it will own. A preliminary commitment of $5,000,000 was made to United Carbon Co., Inc., "Maryland," of Charleston, W. Va., for a plant at Odessa, Tex., estimated to cost a total of $7,000,000. Another preliminary commitment of $1,000,000 was made to Charles Eneu Johnson & Co., Philadelphia, for plant facilities at Eunice, Lea County, New Mexico, estimated to cost $3,000,000. DPC also increased to $1,500,000 a preliminary commitment to Cabot Carbon Black Co., Boston, for plant facilities at Guymon, Okla., estimated to cost a total of $3,000,000.

The Texas Railroad Commission is granting an emergency 30-day waiver on use of sweet gas at several Texas plants to provide an additional 1,500,000 lb. a month immediately.

Carbon-black production is now under 80,000,000 lb. a month. The emergency measures are expected to raise it to 84,000,000 lb. a month by April and 94,000,000 by July.

Requirements for 1945, however, are estimated at 1,255,000,000 lb., an average of more than 100,000,000 lb. a month.

Pipe Line Equipment



CRC CRUTCHER-ROLES-CUMMINGS

HOUSTON, U. S. A.

PIPE LINES

Gulf Completes Line to Ellenburger Field

Gulf Refining Co. has completed and placed in service its 63-mile 8-in. crude line from the Keystone-Ellenburger field to Midland, Tex., according to the Petroleum Administration for War.

Progress on other pipe line projects as contained in PAW's latest report follows:

Project No. 33: Texas-New Mexico Pipe Line Co.'s 30 miles of 12-in. loops between Crane and Houston, Tex. All pipe has been received and strung. Part of the increased capacity will be available in March. However, all station work is not expected to be finished until after April 1.

Project No. 35: Sinclair Refining's 60-mile, 8-in. crude line from Big Sand Draw and Crook's Gap oil fields to Lost Soldier, Wyo. All pipe for the 23-mile, 8-in. line from Crook's Gap to Lost Soldier has been welded, but only 5 miles laid in trench. The remainder has been laid on the surface because of weather conditions, and will be placed in ditch this spring.

Project No. 36: Interstate Oil Pipe Line Co.'s 120 miles of crude lines from Mississippi oil fields to Baton Rouge, La. Construction work cannot start until pipe is received from mill. Approximately 68 miles of field survey work is completed.

Project No. 37: Utah Oil Refining Co.'s 90-mile, 6-in. crude line from Rangely pool to Craig, Colo. Construction is expected to start about May 1. Pipe is to be received this quarter, and completion is expected in July.

Magnolia to Install Five New Pumping Units

Magnolia Pipe Line Co. has been granted priorities to install five new electric-powered pumping units on its 12-in. line from Midland to Corsicana, Texas. Pump stations at Clyde and Walnut Springs will each get two of the new units and the Mertens station is to get one. Some of the pumping equipment in those three stations is to be transferred to Midland, and used at the terminal. Addition of the new equipment will increase capacity of the line by 7,000 bbl. per day, from present maximum of 55,000 bbl. each 24 hours, to 62,000 bbl. This line is used to move regular Permian Basin sour crude.

Magnolia's 8-in. sweet crude line from Midland to Corsicana is now moving about 22,000 bbl. of oil each day.

Kansas Power & Light Co. Seeks Expansion Permit

The Kansas Power & Light Co. is seeking authorization to build 18.5 miles of 16-in. line in Barber County, Kansas, to connect with an 18-in. line near Pratt; to construct 20,500 ft. of 8-in. line in Barber County to connect with the 16-in. line and extend east; to construct and operate 4,500 ft. of 8-in. line in Barber County, 14,000 ft. of 4-in. line to connect with the wells, and a gasoline recovery and dehydration plant northwest of Lake City.

The project, it is estimated, would cost more than $596,000.

New Larue Pool Given Outlet With 3-in. Line

The first pipe-line outlet for the Bacon lime Larue field in Henderson County, Texas, north of Athens is under construction by Merrimac Oil Co. It is a 3-in. welded line from the discovery well, Lone Star Producing Co. 1 Lee, Walters Survey, to the Ash Switch loading rack on the Cotton Belt 3 miles from the field.

Panhandle Eastern Plans Gas Line Into Canada

WASHINGTON. — Federal Power Commission will hold a hearing May 15 on applications filed by Panhandle Eastern Pipe Line Co. for authority to export natural gas into Canada and to construct and operate additional facilities for the transportation and sale of natural gas in interstate and foreign commerce.

Panhandle last November entered into a 20-year contract with Union Gas Co. of Canada, Ltd., whereby Panhandle proposes to deliver to the Canadian company 5,500,000,000 cu. ft. of natural gas during the spring, summer, and fall months of each year. Panhandle may also deliver, upon request of the Canadian company, additional gas up to 15 per cent of the volume of firm gas

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McCORD
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DETROIT, MICHIGAN
LUBRICATOR DIVISION

agreed upon. The contract specifies that Panhandle is under no obligation to deliver gas to the Canadian company in December, January, February, and March of each year. Panhandle has also applied for a presidential permit for authority to construct and operate facilities at the international border near River Rouge, Mich., to export such natural gas to the Canadian company.

Panhandle proposes to construct a 16-in. pipe line connecting with its main 22-in. transmission line at its Detroit regulator station in Allen Park, Mich., and extending to River Rouge, Mich., and from there to the west bank of the Detroit River. The applicant proposes to construct two parallel 12¾-in. pipe lines connecting with the 16-in. line at the west bank of the Detroit River in River Rouge. These lines will extend easterly underneath the Detroit River to connect with transmission lines of the Canadian company. Panhandle also proposes to construct a pressure-reducing station, and a measuring station between its existing 22-in. transmission pipe line and the proposed 16-in. line.

The State Corporation Commission of Kansas, Pennsylvania Public Utility Commission, Public Service Commission of Indiana, Public Service Co. of Indiana, Inc., and the public counsellor of Indiana have been permitted to intervene in the proceedings.

Method of Fixing Pipe-Line Valuations Explained

The procedure for bringing pipeline valuations down to date is presented in detail in a brochure prepared by J. Marshall White, of Houston, and Alfred Raws, Jr., of Philadelphia. The authors explain that some time ago they had occasion to set up such valuations and had opportunity to discuss the work with representatives of Interstate Commerce Commission. They point out that the procedure does not necessarily represent the methods used by ICC and that their procedure has not been approved by that body.

P.W.E.P. Renews Proposal For Pacific Coast Line

Application for rehearing is being made this week by Pacific War Emergency Pipelines, Inc., on its proposal to build a pipe line from West Texas to the Los Angeles area.

Reinstatement of the proposal, declared L. M. Glasco, Dallas, secretary of the P.W.E.P. corporation, is being asked as a follow up to the Petroleum Administration for War announcement that increased movement of West Texas crude oil to California is urgent.

"This application," Glasco said, "was turned down by Petroleum Administrator Harold L. Ickes in June, claiming that there is not enough oil in West Texas for the line and not enough refinery capacity in California to handle it.

"The oil line to California could carry crude oil from West Texas for around 50 cents a barrel, compared with $2.277 which DSC is absorbing," Glasco continued.

Arabian American Will Build Persian Gulf Line

Participation of the United States Government in the proposed trans-Arabian pipe-line project now appears unlikely, the Texas Co. said last week in its annual report.

The government had agreed to construct and retain ownership of a trunk pipe-line system to transport crude oil from the Persian Gulf area to a port on the eastern end of the Mediterranean, the report explained, but added "at the moment, the building of the pipe line is held in abeyance and it is doubtful that the government will proceed with this project as a government-owned pipe line."

However, it continued, the Arabian American Oil Co., owned jointly by Texas and Standard Oil Co. of California, has sent engineers and specialists to the Middle East to make preliminary surveys of possible routes and terminal locations and to do certain preliminary work in procuring rights-of-way.

"It is the intention of this company," the report said, "to procure the necessary rights-of-way as promptly as possible and this line will undoubtedly be built within the next few years as it is sound economically."

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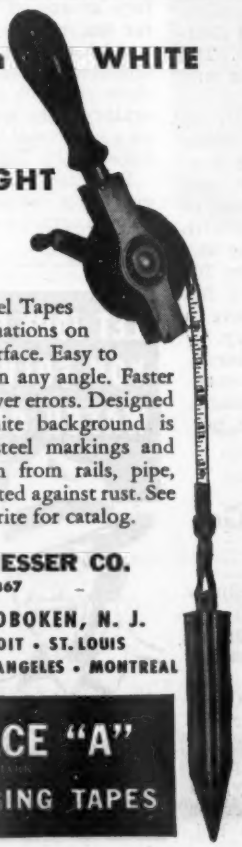

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REFINING

Oil Technicians Developed Bomb That Blasted Tokyo

WASHINGTON. — The M-69 incendiary bomb, used with devastating effect in raids over Tokyo, Osaka and Nagoya, was developed with the Army's Chemical Warfare Service by Standard Oil Co. (New Jersey) technicians assigned to the project by National Defense Research Committee. The bomb was demonstrated publicly last June at Standard's proving grounds in Bayway, N. J.

The bomb contains jellied gasoline which is forcibly scattered in gobs of sticky flaming material against the sides of buildings or inside them, if it pierces the roof. It can be dropped in aimable clusters. The M-69 looks more like a piece of hexagonal pipe than like a bomb. It is cut off square at the ends and has no fins, but receives its stability from cloth streamers which come out when the bomb falls free. The streamers slow the fall of the bomb to a speed which gives it adequate power to pierce a roof without damaging its internal mechanism. The clusters of bombs break open and scatter as they fall earthward.

The bomb is equipped with an inertia fuse and a powder train. The latter ignites an explosive mixture which hurls a cheesecloth sack of 2½ lb. of jellied gasoline out of the tail of the metal container with enough force to smash the bag and scatter flame against an edifice 100 feet away. Thus bombs which fail actually to hit a building have a fair chance of firing it anyway.

Volume manufacture of the incendiary was contracted to many manufacturers who, during initial stages, were aided in many cases by personnel loaned by Standard.

Orders to Share Crude Go To 13 Midwest Refiners

CHICAGO. — Thirteen refiners have received directives from Petroleum Administration for War requiring them to share a total of 15,580 bbl. of crude oil daily with 20 other refiners in District 2 (Midwest) throughout March under the wartime crude allocation program. This is the same number of supplying companies as in February, an increase of two in the number of recipients and a drop of 650 bbl. daily in the quantity of crude named. It is the smallest volume of crude yet involved in the allocation plan, which is under the direction of the crude supply panel of the district refining committee operating under a government-industry program to help alleviate the crude shortage.

Site Chosen for Oil-Shale Demonstration Plant

WASHINGTON. — The site for a $1,500,000 oil-shale demonstration plant on United States Naval Oil-Shale Reserves, in western Colorado, has been decided upon by the Bureau of Mines. The plant, one of the major installations authorized by Congress in the Synthetic Fuels Act, is to be established in the Anvil Points area, about 7 miles west of Rifle, and will serve as a proving ground for processes being developed to convert the nation's large reserves of oil shale into an auxiliary source of fuels and lubricants for the military forces and the essential civilian economy. It will be operated in conjunction with an oil-shale research and development laboratory to be built at Laramie, Wyo., on a site donated to the federal Government by University of Wyoming.

Selection of the two sites puts in operation essential parts of the 5-year program embracing liquid fuels

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from both coal and shale sources. Bureau of Mines technicians are overseas examining captured German plants which made synthetic fuel from coal. At Bruceton, Pa., the coal synthetic-fuels laboratory is under construction. There remains the selection of a site for a demonstration plant to make liquid fuels from coal.

B. of M. Making 10 Gal. of Synthetic Gasoline Daily

PITTSBURGH. — The Bureau of Mines experimental plant here is now making 10 gal. of gasoline daily from coal and gas. With the completion next summer of a pilot plant at Bruceton, near here, the output of synthetic fuel will be increased to 40 gal. Development of synthetic gasoline from these sources will be slow, according to Dr. H. H. Storch, chief of research, who says it will be 3 years before the first commercial plants are built and 10 before full-scale production can get under way. The work now is designed to develop sources of supply in the event of another war.

The synthetic fuel will cost from 25 to 200 per cent more than the natural product, Dr. Storch says, depending on the production method.

In Pittsburgh, center of the bituminous coal industry, much of the experimentation is with the direct coal hydrogenation process. Coal is crushed and mixed with thick black oil, the product of a previous processing.

The resultant paste, resembling paving asphalt, is pumped through pipes to a high-pressure converter, where hydrogen is mated with the carbon of the coal. The products include light and heavy oil and sludge.

This method produces a gasoline of 70-75 octane content which can be doctored with lead to 85-octane rating. It is possible at increased cost and reduced yield to raise the octane number somewhat over 90. However, the direct method requires four to five tons of high-volatile bituminous coal to produce a ton of gasoline.

In the indirect process, natural gas is converted to water gas which is mixed with catalysts to produce gasoline. This process is cheaper. It also produces a superior grade of diesel oil, but the motor fuel has a low octane number of about 55.

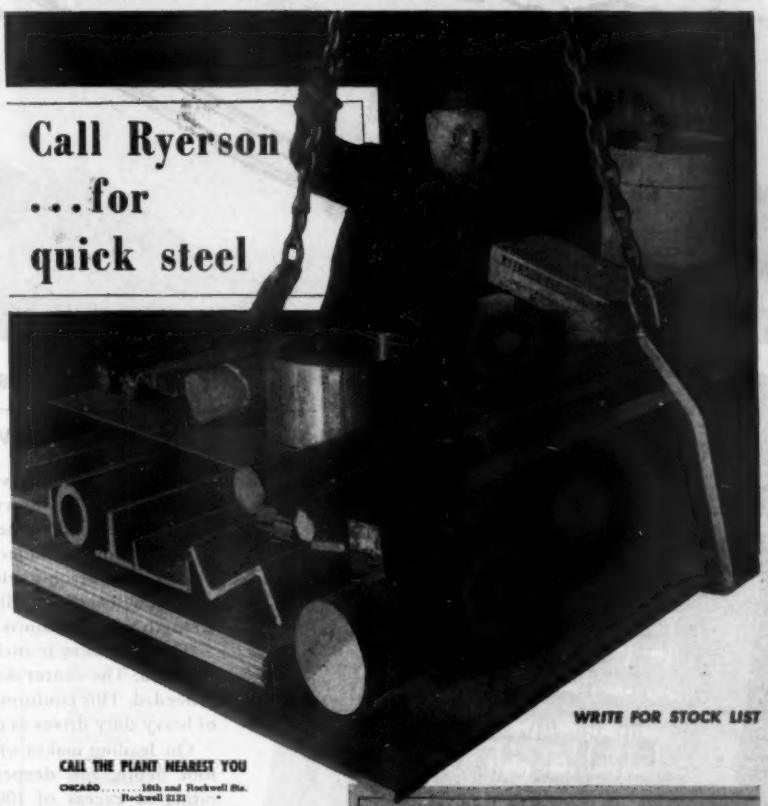
Dr. Storch emphasizes that the Government does not plan to compete with the oil industries. Its research is designed to gain information which will be turned over to commercial companies.

Most of the synthetic gasoline now produced is used in studying composition and in engine tests. The increased yield at the new Bruceton plant will be used to drive cars around the bureaus. What is left will be offered to the Army and the Navy. If they don't want it, it will be sold to commercial companies.

Millionth Barrel of Aviation Fuel Made by Associated

DUNCAN, Okla.—Associated Refineries, Inc., which went on stream early in 1944, has manufactured its millionth barrel of aviation gasoline. The plant draws its raw material from eight independent refining companies, all within southern Oklahoma and northern Texas: Anderson-Prichard Oil Corp., Bell Oil & Gas Co., Ben Franklin Refining Co., Fen-Ter Refining Co., LaSalle Petroleum Corp., Panhandle Refining Co., Rock Island Refining Co., and W. T. Waggoner estate. The facilities combine catalytic cracking, gas concentration, alkylation and isomerization, so as to provide a self-dependent and complete plant to make finished 100-octane gasoline.

At the recent annual meeting, the following officers were elected: President, M. Lloyd Freese; chairman of the board, L. B. Simmons; vice presidents, B. I. Lubell, R. B. Anderson, R. C. Stanford; secretary-treasurer, Dr. H. B. Alspaugh; assistant secretaries, C. D. Cund, I. A. Anson.



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The 1150-B excavator can dig 140 feet deep and can dump about 360 feet from where it digs. It has a 25-yd. drag bucket on a 180-foot boom. The combined weight of the bucket and full load is 130,000 pounds.

Aside from its size the phenomenal thing about a machine weighing 2,410,000 pounds is—it walks.

The walking equipment is composed of three major operating parts on each side of the revolving frame—cam, cam track, and shoe—and like a huge giant the machine steps off 7½ feet at one time. Needing no steering mechanism, the 1150-B moves in whatever direction the walking shoes point. It can sidestep at any angle, zigzag between work locations, travel over soft and irregular ground, and can detour around obstructions. Direction is changed simply by swinging the revolving frame.

While digging, the walking shoes are carried high on the frame. To walk, both shoes are lowered simultaneously, part of the weight is transferred from the mast to the shoes; the base tilts lifting the forward part free of the earth; and the whole machine skids forward and then settles down without a jerk or shock.

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The durability is such that no provision for chain take-up is required. The center distance of the sprockets is fixed—no idler is needed. This conforms to customary practice in the installation of heavy duty drives as used, for example, in the oil industry.

On leading makes of drilling rigs, for wells of 5000 to 15000 foot depth, and deeper, including those with engines of total rating in excess of 1000 HP, the drives in the 3- and 4-speed transmissions are equipped with parallel Diamond Roller Chains, the two sprockets for each of the various ratios being installed on a common, fixed center distance.

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Exploration and Drilling

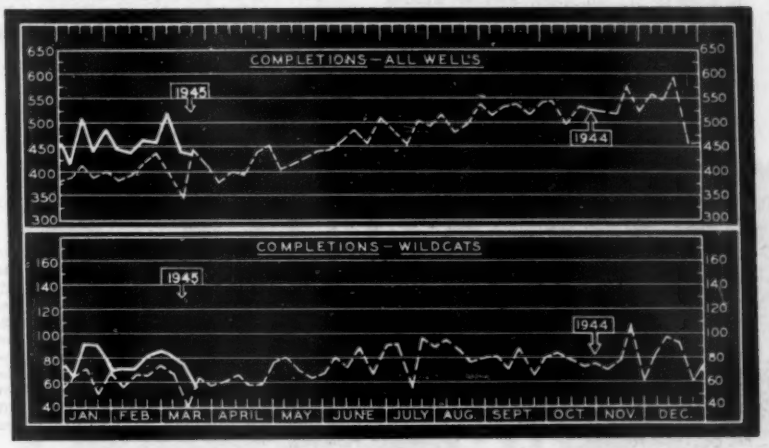
Week's Highlights

TWO Continental Oil Co. wells in the Elk Basin field of northwestern Wyoming have suddenly complicated the field's geological picture considerably. Continental 1 Goodstein, NE SE SW 20-57n-99w, 3 miles south of the nearest Tensleep production in the field, on drill-stem test looks good for 100 bbl. per hour or better.

Meanwhile Continental 12 Northern Pacific, NE NW SE 5-57n-99w, southeast edge well of the field proper, has apparently cut a fault and gone back into formations above the Dakota, which will throw the Tensleep very low. This is probably the northeast-southwest fault indicated on the U.S.G.S. recent structure map of Elk Basin, cutting across the south end of the structure at a decidedly different angle from the small transverse faults farther north.

The Goodstein test seems likely to be either on a separate structure, or on a downthrow faulted block of considerable displacement. At present total depth of 7,004 ft., the Tensleep is producing from —2,095 ft., whereas the lowest Tensleep pay on the west side of the field proper is —1,332 ft., and the highest Tensleep water level to date in that area is —1,718 ft. This puts Tensleep production in the Goodstein test at least 377 ft. lower than the highest Tensleep water level to the north, and production at least 763 ft. lower than the lowest oil pay farther north.

This test has looked good all the way down. Second Frontier, topped at +555 ft., on drill-stem test at +555 to +519 ft., showed 3,000,000 cu. ft. gas. Dakota, topped at —485 ft., on drill-stem test at —489 ft. to —538 ft., showed 11,000,000 cu. ft. gas. Morrison, topped at —742 ft., on drill-stem test at —745 ft to —777 ft., showed 2,000,000 cu. ft. gas. Sundance, topped at —976 ft., on drill-stem test at —976 ft. to —1,025 ft., showed a small volume of sweet gas. Phosphoria Embar, topped at —2,016 ft., showed oil stains and saturation. Tensleep was topped at —2,051 ft., and the top 10 ft. was tight. On drill-stem test at —2,062 ft. to —2,085 ft., it filled up with 4,875 ft. of 28° plus gravity oil in 3½-in. drill pipe in 15 minutes.



Solid line charts current weekly completions, service wells in Eastern area included

COMPLETIONS IN ALL FIELDS . . .

Week ended March 17, 1945

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1945	1944
N. Y., Penna., W. Va.	50	13	*46	109	170,176	1,088	694
Ohio	4	6	3	13	45,098	147	195
Indiana	0	0	0	0	0	36	50
Kentucky	1	1	3	5	9,801	79	122
Illinois	11	0	12	23	66,513	347	351
Michigan	7	1	6	14	38,407	149	107
Kansas	9	0	6	15	48,736	291	367
Nebraska, Missouri, Iowa	0	0	0	0	0	10	12
Oklahoma	18	3	6	27	116,080	481	304
Texas:							
North Central	12	0	13	25	74,958	405	267
West	32	0	4	36	203,433	377	289
Panhandle	7	5	2	14	47,961	119	28
Eastern	1	4	3	8	59,724	65	63
Gulf Coast	33	2	11	46	298,192	350	114
Southwest	6	0	3	9	37,207	134	206
Total Texas	91	11	36	138	721,475	1,450	967
Louisiana:							
Northern	3	0	1	4	28,695	57	52
Southern	10	0	3	13	119,408	127	88
Total Louisiana	13	0	4	17	148,103	184	140
Arkansas	1	0	0	1	8,289	27	46
Mississippi	4	0	2	6	39,032	68	28
Southeastern States	0	0	1	1	6,597	5	†
Montana	3	1	0	4	14,743	61	45
Wyoming	3	0	0	3	13,876	44	30
Colorado-Utah	0	0	0	0	0	7	8
New Mexico	4	0	1	5	15,682	101	86
California	36	2	13	51	203,624	490	373
Total United States	255	38	139	432	1,666,232	5,066	3,925
Total previous week	218	56	161	435			
Total March 18, 1944	245	24	145	414			

*Includes 42 service wells. †Included in total for Mississippi.

SOUTH LOUISIANA

West Oretta Wildcat Awaits Potential Test

NEW ORLEANS. — Magnolia Petroleum Co. 1 Musser-Davis Lumber Co., wildcat in West Oretta area, Beauregard Parish, was completed through perforations at 8,708-12 ft., no gage, and is waiting on potential. Total depth is 9,103 ft., with 5½-in. casing set at 8,830 ft.

T. G. Markley 1-A Knox, Amis & Farnbacker, at University field, East Baton Rouge Parish, flowed potential of 152 bbl. day through a 7/64-in. choke, gas-oil ratio 1,940 to 1, through perforations at 9,600-14 ft., tubing pressure 14,75 lb., gravity 41.2°, 0.1 per cent water. Total depth is 9,790 ft. in shale, with 5½-in. casing set at 9,752 ft.

Humble Oil & Refining Co. 2 Robert D. Guillory, Pine Prairie field, Evangeline Parish, was completed through perforations at 7,864-82 ft., flowing 6.21 bbl. per hour through a ⅛-in. choke, gas-oil ratio 1,009 to 1, tubing pressure 910 lb., gravity 38.2°.

Stanolind Oil & Gas Co. 1 Wilbert Mineral Corp., Bayou Blue field in Iberville Parish, was completed through perforations at 7,135-40 ft., flowing 8 bbl. per hour through a ¼-in. choke, tubing pressure 1,200 lb., casing pressure 1,150 lb., total depth 7,161 ft. in salt, 5½-in. casing set to 7,158 ft.

Continental Oil & Humble 1 W. D. Haas estate, Reddell field, Evangeline Parish, was completed through perforations at 9,796-9,806 ft. in the Tate sand, after coring from 9,794 to 9,844 ft. Potential was 121 bbl. day through a 12/64-in. choke, tubing pressure 3,000 lb., gravity 55.2°. Total depth is 9,866 ft., with 7-in. set on bottom. The Haas sand from 9,628-40 ft. carried salt water.

Humble 2 I. R. Price, Delta Farms field, Lafourche Parish, was completed through perforations at 9,415-29 ft., flowing 43 bbl. per hour through an 11/64-in. choke, gas-oil ratio 561 to 1, tubing pressure 1,660 lb., gravity 36.3°.

Gulf Refining Co. completed 2-E Haas-Hirsch, at Krotz Springs, St. Landry Parish, as a gas-condensate producer through perforations at 10,050-54 ft., flowing 162 bbl. per day through a 5/32-in. choke, tubing pressure 3,400 lb. Total depth is 10,542 ft. with 5½-in. casing set on bottom.

SUCCESSFUL WILDCAT COMPLETION IN SOUTH LOUISIANA

Jefferson Davis Parish: New oil pay, West Tepetate field—Barnsdall 3 Jos. Fuselier, 38-7s-3w, total depth 9,312 ft., perf. 9,272-76 ft., PT 97.56 bbl. daily through ⅛-in. choke, gas-oil ratio 1,326 to 1, tubing pressure 3,750 lb., gravity 52.46°, no water.

CALIFORNIA

Shell Oil Extends Kirby Gas Field

LOS ANGELES. — Shell Oil Co., Inc., extended the productive limits of its recently discovered Kirby Hill gas field, ½ mile southeastward, with the completion of a second producer, Lambie No. 2, for 14,000,000 cu. ft. of gas per day. The Kirby Hill field, located 15 miles southeast of Fairfield, was the first California discovery of 1945. Successful completion of Lambie No. 2 indicates that the field may add substantially to California gas reserves.

Production at the Elk Hills Naval Reserve has reached 65,000 bbl. per day, 6 weeks ahead of schedule, and will probably be maintained around that mark for the next several months by a limited drilling campaign. The objective was achieved by careful planning and minimizing delays between drilling jobs.

Instead of keeping drilling contractors on a well until it was completed, Standard Oil Co. adopted the practice of having the contractor do only the actual drilling and landing of pipe. Then the production crews took over, rigged up pumping equipment and put the well on production.

With the decline in drilling at Elk Hills, the operators at Buena Vista Hills are stepping up operations, as they have about 150 proven locations to drill.

Lack of success in opening new fields is resulting in substantial increases in deep drilling in proven fields and in exploratory work around the edges of older fields. At Long Beach, Shell Oil Co., Inc. 48-A Alamitos is finding hard drilling at 11,264 ft. Shell's deep test at Dominguez is having hard drilling at 11,951 ft., and may not be much above the basement rock.

Barnsdall Oil Co. is still working on its deep test in the Newhall field, and will test the sixth Miocene sand after squeezing both above and below this zone. This well will probably find at least one new productive zone.

WILDCAT FAILURES COMPLETED IN CALIFORNIA

Kern County, Fruitvale district: General Petroleum 84-16 Kernlandia, 16-29s-27e, dry, TD 8,117 ft.

San Benito County, Hollister district: San Benito Oil Co. 1 Fries-Regan, 10-13s-5e, dry, TD 4,457 ft.

Los Angeles County, La Habra district: Associated Pipe & Engineering Co. 1 Simmons, 1-3s-11w, dry, TD 5,464 ft.

Monterey County, Moss Landing district: General Petroleum 1 Vierra, 7-13s-2e, dry, TD 5,739 ft.

N. CENTRAL TEXAS

Two Clay County Tests Have Good Shows

WICHITA FALLS.—Continental Oil Co. 1 Thomas, a wildcat in Block 37, Freestone County School Lands, 2 miles north of Newport, in southeastern Clay County, logged conglomerate with good stain and odor of oil from 5,791-5,802 ft. Caddo was topped at 5,773 ft. Drill-stem test will be run from 5,791-5,802 ft. G. E. Kadane & Sons 1-B Pat Barry, a wildcat in Section 2,626, TE&L Survey A-485, 5 miles east of Windthorst, in Clay County, drilled sand with show of oil from 3,151-52 ft. It was cored from 3,152-68 ft., total depth. Electrical log was run, plug was drilled, was cleaned out and is now testing. Thos. D. Humphrey 1 First State Bank et al, a wildcat in Section 2, BS&F Survey A-2,243, 13 miles east of Graham, Jack County, topped Caddo at 3,923 ft. and Mississippian at 4,616 ft. There was a slight show of oil in lime at 3,950-81 ft. Total depth is 4,681 ft. The well will be plugged back and tested.

The Texas Co. has staked 1 M. Morris, 4,200-ft. wildcat, 330 ft. from the north and east lines of M. Wilkinson Survey, 7 miles southeast of Gainesville, Cooke County. Mid-Continent Petroleum Corp. has staked a 6,000-ft. wildcat 24 miles west of Crowell, in Foard County. It is 1 Tom L. Burnett, and is 660 ft. from the north and west lines of the southeast quarter of Section 9, Block L, SPRR Survey. H. W. Snowden 1 Ella Thomas, a new wildcat, has been staked 4 miles southwest of Bridgeport, Wise County. It is 420 ft. from the north and west lines of Block 27, Matagorda County School Lands.

SUCCESSFUL WILDCAT COMPLETION IN NORTH CENTRAL TEXAS

Jack County: New oil pool discovery—Panhandle 1 Cherryhomes, R. S. Gorder Sur. A-126, 5 mi. SE Jacksboro, elev. 1,221 ft., Caddo 4,804 ft., flowed 664 bbl. day through ¾-in., perf. 5,035-50 ft., TD 5,092 ft.

WILDCAT FAILURES COMPLETED IN NORTH CENTRAL TEXAS

Archer County: D. H. Bolin 1-A E. Col-

DAILY AVERAGE PRODUCTION FOR WEEK

	Mar. 17 crude oil	Distillate, allied products	March PAW quota all oils	Mar. 10 crude oil
Alabama	250	.....	300	250
Arkansas	80,300	5,200	85,200	81,200
California	911,350	58,810	966,160	905,750
Colorado	11,050	.....	9,500	11,000
Eastern	59,500	8,400	76,600	61,550
Illinois	182,400	12,000	210,000	201,200
Indiana	10,500	.....	12,000	12,300
Kansas	271,300	4,300	278,300	251,450
Kentucky	14,500	3,200	35,200	27,200
Louisiana	365,800	40,000	400,000	366,300
North Louisiana	70,150	.....	.....	70,650
South Louisiana	295,650	.....	.....	295,650
Michigan	50,100	700	47,700	46,800
Mississippi	51,500	.....	53,000	50,450
Montana	23,300	300	23,300	23,300
Nebraska	950	.....	1,000	900
New Mexico	103,600	4,900	109,900	103,750
Oklahoma	368,950	28,000	391,000	369,200
Texas	2,159,000	156,000	2,316,000	2,159,000
East Texas	381,000	.....	.....	381,000
East Central Texas	146,700	.....	.....	146,700
North Central Texas	149,300	.....	.....	149,300
Texas Panhandle	88,000	.....	.....	88,000
West Texas	477,400	.....	.....	477,400
Southwest Texas	352,150	.....	.....	352,150
Texas Gulf Coast	564,450	.....	.....	564,450
Wyoming	99,350	3,600	103,600	99,150
Total United States	4,763,700	325,410	5,118,760	4,770,750
Change from previous week	down 7,050			

Total production January 1-March 17, 1945	360,324,350 bbl.
Same period last year	338,390,125 bbl.

gan, Sec. 2, SPRR Sur. A-1253, 5 mi. N and 2 mi. E Magargel, dry, TD 1,518 ft.

Cooke County: Seitz, Comegys & Seitz 1 J. L. Parker, S. E. Clements Sur. A-290, 14 mi. NE Gainesville, dry, TD 6,005 ft.

WILDCAT FAILURES COMPLETED IN WEST CENTRAL TEXAS

Callahan County: Mrs. F. Gunnell et al 1 Russell et al, Sec. 1, Bayland Orphan Asylum land, elev. 1,563 ft., dry, TD 601 ft.

Jones County: Anderson-Prichard Oil Corp. 1-A Tom Parkinson, M. Fragosa Sur. No. 209, 8 mi. SW Anson, dry, TD 3,755 ft.

Rowden 1 McCaleb, Sec. 5, MEP&P Sur., 1 mi. SW Anson, dry, TD 2,695 ft.

TEXAS GULF COAST

Brazos County Well Is Making New Depth Record

HOUSTON.—Phillips Petroleum Co.'s deep well in the Millican area of Brazos County, 3 Fannie Schoeps, is drilling below 16,246 ft., to become the world's deepest well, that being the depth at which the record was set in December 1944 by Standard Oil Co. of California's well in Kern County, California. The operator will release detailed information upon completion of the well.

Atlantic Refining Co. 1 Houston-American, in BBB&C Sur., discovery well of the South Hyatt field in Tyler County, flowed 399.60 bbl. per day on potential test through a ¼-in. choke from perforations at 8,379½-82 ft., with 2½-in. tubing set at 8,315 ft. It showed tubing pressure of 2,375 lb., casing pressure sealed off, gas-oil ratio 4,850 to 1, gravity 54.9°, 0.3 per cent water. Total depth is 9,015 ft., top of sand 8,374 ft.

ElTex, Ltd., has extended the Spring field in Harris County, one location north at its 1 Bridget Kelly Walton, in Wiley Smith Survey, which was completed through perforations at 6,237-40 ft., flowing a potential of 217.07 bbl. day through 10/64-in. choke, tubing pressure 1,450 lb., casing pressure 2,250 lb., gravity 39°, 0.3 per cent water, 2½-in. tubing set at 6,250 ft. Top of Cockfield sand at 6,225 ft., total depth is 6,276 ft., with 7-in. casing on bottom.

Standard Oil Co. of Texas 2-110 State-Galveston Bay, in the northwest extension area at Smith Point, Chambers County, flowed a potential of 200 bbl. daily through a ⅛-in. choke, tubing pressure 1,400 lb., gas-oil ratio 730 to 1, gravity 40.9°, no water. It was completed through 24 perforations at 8,132-37 ft., total depth 8,225 ft., with 7-in. set at 8,223 ft.

Navarro Oil Co. 1 Edward R. Bolton et al, a wildcat 3 miles east of Glendale, in Henry Bond Survey, total depth 10,500 ft., set and perforated a liner in the Woodbine zone and swabbed oil, mud and wash water on a production test. Base of the Woodbine in this well was 10,470 ft., and 5½-in. liner was previously set at 9,909 ft. Before running liner it had tested in open hole recovering 3,000 ft. mud, 5,364 ft. oil and 278 ft. drilling mud. Operators are acidizing, after pulling liner, before running tests in the Woodbine.

Humble Oil & Refining Co. 3 M. E. Mayes, second well in the Mayes field, Chambers County, flowed a potential of 724.29 bbl. daily through a ¼-in. choke, from perforations at 8,166-69 ft., tubing pressure 1,200 lb., casing pressure 1,475 lb., gravity 41.8°, with a trace of water, gas-oil ratio 754 to 1. Total depth 8,550 ft. in hard shale, with 5½-in. set at 8,267 ft. and 2-in. tubing at 8,033 ft.

Humble 6 Mrs. Mattie Lee Kirby, in the Silsbee field, Hardin County, is completing in the 7,400-ft. sand, top of cement 7,465 ft., flowing 6.9 bbl. per hour through a ⅛-in. choke, tubing pressure 1,575 lb., gas-oil ratio 1,200 to 1, gravity 42.1°. Total depth is 8,128 ft., with 5½-in. set on bottom. This is an east offset to American Republics-Houston of Texas 10 Brooksfee, discovery well in the 7,400-ft. sand.

Glenn H. McCarthy and Texas Co. 1 Geo. R. Bauer, wildcat in G. J. Peterson Survey, about midway between Winnie and Nome townsites, in Jefferson County, was abandoned at total depth of 10,020 ft., after running electric log.

SUCCESSFUL WILDCAT COMPLETION IN TEXAS GULF COAST

Tyler County: New oil pool discovery, South Hyatt field—Atlantic Refining 1 Houston-American, BBB&C Sur., Abst. 139, Sec. 3, top sand 8,374 ft., TD 9,015 ft., perf. 12 holes 8,379½-82 ft., PT 399.60 bbl. daily, ¼-in. choke, gas-oil ratio 3,850 to 1, TP 2,375 lb., gravity 54.9°, 0.3 per cent water.

WILDCAT FAILURES COMPLETED IN TEXAS GULF COAST

Jackson County: Roxie Wright 1 E. H. Seidel, Henry Smith Sur., 3 mi. NE Edna, dry, TD 6,050 ft.

Jefferson County: Glenn H. McCarthy-Texas Co. 1 Geo. R. Bauer, G. P. Peterson Sur., midway between Winnie and Nome townsites, dry, TD 10,020 ft.

Shell 1 McFaddin, Tr., Port Acres area, 6 mi. W of Port Arthur in N. W. Smith Sur., dry, TD 9,066 ft.

Matagorda County: Shell 1 Mrs. Isabell H. Thome, G. Pentecost Sur., 3 mi. W of Sargent, dry, TD 6,832 ft.

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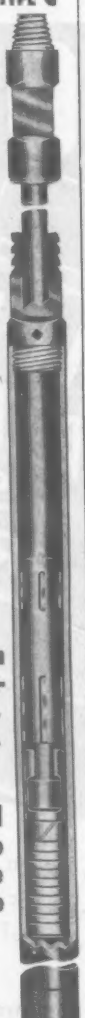

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PERMIAN BASIN

Andrews County Devonian Test Looks Promising

MIDLAND.—Shell Oil Co., Inc. and The Texas Co. 1 Ratliff & Bedford, Sec. 4, Blk. 73, PSL Survey, lower Permian and Devonian prospect in southwestern Andrews County, about 9 miles west of the West Andrews field, made a 50-minute drill-stem test from 8,859-84 ft., showed gas in 17 minutes and recovered 800 ft. of very heavy oil and gas-cut mud. The packer failed after 50 minutes. A drill-stem test is to be made at 8,934 ft. in lime.

Stanolind Oil & Gas Co. 1-P University, Section 44, Block 13, University lands, wildcat in central Andrews, 3½ miles south of Mid-Continent Petroleum Corp. 1-7 University, Devonian discovery well, is coring below 8,823 ft. The well was cored from 8,805-23 ft. and recovered 14 ft. of crystalline dolomite with no shows.

Stanolind 1-O University, Section 20, Block 13, University lands, is a new producer for the Fullerton-Deep pool. On a drill-stem test of the Devonian section from 8,460-8,589 ft., total depth, it flowed 132 bbl. oil in 1 hour. The well is to be completed at present level.

Magnolia Petroleum Corp. 1-A Ralph, wildcat 1 mile west of the Fullerton pool, topped the Ellenburger at 10,671 ft. Core from 10,773-83 ft. recovered 2½ ft. of dolomite with no show. A later core was taken from 10,783-85 ft. but recovery was not reported.

Sun Oil Co. 1 Martin, 1½ miles north of the Embar pool in southern Andrews, swabbed at 7,036 ft. and showed some fresh water with a small amount of oil. Total depth is 7,045 ft. in lime.

Richardson & Bass 1 KCS, Section 25, Block B-2, PSL Survey, a wildcat 2¼ miles south of the Keystone-Ellenburger pool in Winkler County, recovered 300 ft. of oil and gas-cut mud on a drill-stem test from 8,852-8,955 ft. Another drill-stem test is being made at 9,055 ft.

Rowan Drilling Co. 1 TXL, in Ector County, 2¾ miles southeast of the TXL pool, is running casing to complete after the last drill-stem test from 7,922-70 ft., recovered 800 ft. of oil and gas-cut drilling mud. The company has staked its second well in the pool, 2 TXL, 1,320 ft. due south of its 1 TXL. It is in Section 29, Block 45, T-1-S, T&P Survey. Shell 1-A Thomas, ¾ mile north and east of the pool, is running a drill-stem test at 7,935 ft., the level in which the discovery well found production. Texas 1-B Frazier, 4 miles south of the pool, is drilling below 8,652 ft. in lime and chert.

SUCCESSFUL WILDCAT COMPLETIONS IN WEST TEXAS

Andrews County: New oil pool discovery.—Stanolind 1-D University, SE SW Sec. 8, Blk. 11, Univ. land, 5 mi. NW Embar pool, elev. 3,327 ft., plugged back to 8,385 ft., top pay 8,300 ft., flowed 289 bbl. day through ¼-in. choke on tubing, perf. 8,300-50 ft. Devonian, gravity 41, gas-oil ratio 732 to 1, TP 560 lb., Fullerton 6,610 ft., Devonian 7,965 ft., Montoya 9,030 ft., Ellenburger 10,057 ft., TD 10,466 ft.

Crockett County: New oil pay—Amerada 7-A Todd, Sec. 25, Blk. WX, GC&SF Sur., elev. 2,622 ft., IP 950 bbl. day through ¾-in. choke, perf. 6,232-6,318 ft., Ellenburger, gravity 41.9°, gas-oil ratio 455 to 1, Crinoidal 5,779 ft., Simpson 5,928 ft., Ellenburger 6,064 ft., TD 6,350 ft.

Hockley County: New oil pool discovery—

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Texas 1 L. Y. P. Montgomery, Labor 19, League 70, Val Verde CSL, 6 mi. N Slaughter field, elev. 3,600 ft., top pay 4,750 ft., pumped 95 bbl. day through 2-in. tubing, perf. 4,765-80 ft. San Andres, gravity 29°, gas-oil ratio 825 to 1, TD 4,927 ft.

Lubbock County: New oil pool discovery—Seaboard and Stanolind 1 L. M. Cravens, Sec. 16, Blk. D, L&SV Sur., 2 mi. NW Monroe, elev. 3,311 ft., plugged back to 6,170 ft., top pay 6,050 ft., pumped 136 bbl. day through 2-in. perf. 6,050-6,170 ft., San Angelo 4,390 ft., Clear Fork 4,940 ft., TD 8,800 ft.

Ward County: New oil pool discovery—Gulf 2-B-T John Edwards, Sec. 31, Blk. B-19, PSL, 2½ mi. SE Monahans, elev. 2,635 ft., plugged back to 4,573 ft., top pay 4,385 ft., pumped 61 bbl. day through 2-in. tubing, perf. 4,385-4,562 ft., gravity 36.4°, gas-oil ratio 115 to 1, San Andres 3,420 ft., Clear Fork 4,500 ft., TD 6,439 ft.

WILDCAT FAILURES COMPLETED IN WEST TEXAS

Kent County: Blackwell Oil & Gas 1 A. A. House, Sec. 8, Blk. B, PSL, elev. 2,316 ft., Pennsylvanian 5,840 ft., dry, TD 7,775 ft.

Culberson County: R. E. Richter 1 Daniel, Sec. 12, Blk. 59, T&P Sur., elev. 3,469 ft., Delaware 3,215 ft., dry, TD 4,700 ft.

Lubbock County: Seaboard and Texas & Pacific 2 S. E. Nairn, Sec. 25, Blk. A, PSL, 1 mi. NW Nairn pool, San Angelo 4,370 ft., dry, TD 6,390 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—A new pool for eastern Lea County has been opened by Gulf Oil Corp. 1 E. T. Paddock, C SW SE 1-22s-37e, a wildcat approximately 1½ miles east of the Eunice field and 3½ miles north and slightly west of the Drinkard field. During a 1¾-hour drill-stem test from 5,150-5,288 ft. through a ⅝-in. choke, gas came to the surface in 10 minutes and oil in 70 minutes. The well flowed at the rate of 15 bbl. of 38-gravity oil per hour with 400,000 cu. ft. gas. Glorietta was topped at 5,130 ft. It will be drilled a few feet deeper.

Two and three-fourths miles northwest of the Drinkard field, Samedan Oil Co. 1 O. I. Boyd, 23-22s-37e, is drilling ahead at 4,435 ft. There were shows of oil in the Permian at 3,870 ft. and 4,135 ft. However, a drill-stem test taken in this zone recovered only drilling mud. Continental Oil Co. 3-B-23 Skaggs, 7,800-ft. test in the Skaggs field, is drilling below 6,103 ft. in lime. Neville Penrose, Inc. 1 Federal-fee, 9-22e-37e, 12,000-ft. Ellenburger test in the Penrose field, was coring below 3,453 ft., the Penrose pay section, for geological information.

EASTERN TEXAS

Hunt County Test Cores Dry, Porous Sand

DALLAS.—Ohio Oil Co. 1 V. Popper, O. M. Roberts Survey, wildcat 2½ miles southeast of Cash, in Hunt County, drilled sand and sandy shale with slight oil stain and odor from 7,080-90 ft. and 7,100-10 ft. Core was taken at 7,161-79 ft. and recovered 12½ ft. of slightly ashy sand with fair porosity, but no show.

Hunt Oil Co. 1 D. T. Bullard, L. B. Brown Survey, scheduled 8,600-ft. wildcat, 5 miles northeast of Bettie, in Upshur County, has reached 8,550 ft. in hard sand and is running electrical survey. M. E. Davis 1 Mrs. C. A. Shelby, Thos. Williams Survey, wildcat 1 mile northeast Newsome, Camp County, topped Paluxy at 5,850 ft. and Glenrose at 6,223 ft. It is drilling below 7,005 ft. in sand and shale.

Phillips Petroleum Corp. has moved its rig off of 1 Grelling, Price Survey, approximately ¾ mile northwest of the South Tyler James lime pool discovery in southern Smith County. Total depth is 10,896 ft. North of the discovery, the Phillips 1 Kairston-Johnson, J. Hoper Survey, is drilling below 5,835 ft. in sand, shale and red beds.

WILDCAT FAILURES COMPLETED IN EASTERN TEXAS

Henderson County: Gulf 1 T. D. Frizzell, David Cherry Sur., 1 mi. E Baxter, elev. 459 ft., massive anhydrite 10,810 ft., lower anhydrite stringer 11,490-503 ft., dry, TD 11,687 ft.

Houston County: F. K. Lytle et al 1 S. Watson heirs, R. de Los Santos Coy Sur., 12 mi. SE Crockett, elev. 313 ft., Midway 6,007 ft., dry, TD 6,007 ft.

SOUTHWEST TEXAS

Maraposa Discovery Well Flows 293 Bbl. on Test

CORPUS CHRISTI.—Humble Oil & Refining Co. 1 Dan Sullivan, Acct. 1, discovery well for the Maraposa field, in M. D. Floyd Survey 142, 8 miles southeast of Falfurrias, in Brooks County, on 24-hour potential test, flowed 293.90 bbl. of clean oil through a ⅛-in. choke, tubing pressure 1,500 lb., gravity 40.7°, gas-oil ratio 998 to 1, through 24 perforations at 8,537-45 ft., total depth 8,545 ft., with 5½-in. casing on bottom. Operators are now preparing to perforate for dual com-

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pletion. Humble has staked location for 2 Dan Sullivan, Acct. 2, in TMRR Survey 151, 1,320 ft. north. Contract depth is 10,000 ft.

Sun Oil Co. 1 R. A. Thompson, new discovery, called West Goliad field, 5 miles southwest of Goliad, in Goliad County, on 24-hour potential test flowed 314.64 bbl., no choke, no water, gravity 44.1°, gas-oil ratio 14,272 to 1. This well blew out while coring at 11,192 ft., and drill pipe was pushed up in the hole to 11,149 ft., where it was cemented. It is producing through the port holes in bit around core barrel, through slots on driver, and through 4-in. wing outlet. Sun 1 G. C. Floerke, southwest offset to the discovery, has spudded.

Southern Minerals Corp. 1 J. B. Butts, wildcat 5 miles southeast of Bishop, in Section 11, Petronilla Ranch, Nueces County, was abandoned at total depth of 7,513 ft. after perforating and testing at 7,400-10 ft., 7,225-30 ft., and 7,140-56 ft.

Sun Oil Co. 1 Cora N. Stroman-State, Cora N. Stroman Survey, in Armstrong field, Jim Hogg County, on 24-hour potential test, pumped 48.30 bbl. net oil, 4 per cent water, gravity 37.4°, gas-oil ratio 122 to 1, through 82 perforations at 3,678-83½ ft. Total depth 3,685 ft. with 5½-in. casing on bottom.

Bankhead Oil Co. 2 A. R. Robertson, East Telferner field, Victoria County, on 24-hour potential test, flowed 38.5 bbl. of oil and 71.5 bbl. of water, through a ⅛-in. choke, tubing pressure 340 lb., gravity 22.2°, through perforations at 4,433-35 ft. Total depth is 6,211 ft., and 5½-in. casing is set at 4,535 ft.

SUCCESSFUL WILDCAT COMPLETIONS IN SOUTHWEST TEXAS

Goliad County: New oil pool discovery, West Goliad—Sun 1 R. A. Thompson, Ignacio Guajardo Survey, 5 mi. SW of Goliad, TD 11,192 ft., PT 314.64 bbl. daily, no choke, no perf., producing through drill pipe cemented at 11,149 GOR 14,272 to 1, TP 64 lb., gravity 44.1°, no water.

Hidalgo County: New gas pool discovery—La Gloria Corp. 1 South-Weslaco unit, Section 165, 1 mi. SW of Weslaco, Llano Grande Sur., TD 8,943 ft., perf. 100 holes 7,455-85 ft., and 59 holes 7,404-20 ft., PT 54,000,000 cu. ft. gas, open flow, 2,900 lb. shut-in pressure.

San Patricio County: New oil pool discovery—H. H. Howell 1 C. A. Maedgen, Mathis Ranch subd., Blk 4, 2 mi. SW of Mathis, TD 5,230 ft., top of sand 4,160 ft., perf. 24 holes 4,182-96 ft., PT 26 bbl. daily through ½-in. choke, GOR 53,000 to 1, TP 450 lb., CP 580 lb., gravity 36.5°, water 0.33 per cent.

Willacy County: New oil pool discovery—Texas Co. 5 Yturria Land & Live Stock Co., "San Juan de Carricitos" Jose Narciso Cabozos grant, Share 3, TD 6,985 ft., perf. 12 holes 6,346-49 ft., PT 9.1 bbl. daily through ⅛-in. choke, GOR 2,550 to 1, TP 1,540 lb., gravity 42.9°, b.s. and w. 9 per cent.

WILDCAT FAILURES COMPLETED IN SOUTHWEST TEXAS

Brooks County: Sun 2 Mary M. Lasater, HE&WT Sur. 349, 6 mi. SE of Falfurrias, dry, TD 7,539 ft.

Nueces County: Southern Minerals Corp. 1 J. B. Butts, Petronilla Ranch, Sec. 11, 5 mi. SE of Bishop, dry, TD 7,513 ft.

Webb County: Coastal Refineries, Inc. 1-A A. M. Bruni, Blk. 48, Brown subd., 10 mi. S of Mirando City, dry, TD 2,025 ft.

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CANADIAN FIELDS

Conrad Test Looks Like Big Well

CHATHAM.—In the Conrad field, southern Alberta, Mid-Continent-East Crest 1, LSD 2, 8-6-15w4, halted drilling at 3,158 ft. for drill-stem test of the Ellis sand with indications it may be one of the largest producers in Alberta outside of Turner Valley. Ellis was encountered at 3,152½ ft. with 2½ ft. of tight sand, followed by 3 ft. showing both oil and porosity. In 75 minutes oil rose 1,440 ft. in the hole, with no trace of water. Crude is 27.2° gravity, and later reports indicate at least 200 bbl. daily.

The test was jointly financed by Mid-Continent Oil & Gas and East Crest Oil Co., both of Calgary. No. 2 is being started as a north offset, and California-Standard is also starting an offset to the north. California-Standard has two other producers in the Conrad field, averaging 100 bbl. or better. California-Standard 75-32-B, LSD 12, 32-5-15w, about 2 miles south of the Mid-Continent well, has been abandoned after drilling through the Ellis to 3,269 ft.

Foremost.—In the Foremost area, southern Alberta, Foremost-Province 2, LSD 4, 25-6-12w4, has been abandoned after testing the Devonian limestone to 4,281 ft.

Coalspur.—In the northern foothills, Imperial-Coalspur 1, LSD 10, 3-49-21w5, is in Upper Blairmore, below 11,566 ft., and may establish a new depth record for Canada. The present depth record is held by Shell Exploration-Norman 1, LSD 5, 22-24-5w5, on the Jumping Pound structure west of Calgary, which last year was abandoned at 12,056 ft.

Raymond.—In the Raymond area, southern Alberta, Imperial-Raymond 1, LSD 7, 16-6-20w4, set casing in Devonian limestone at 5,600 ft. and is acidizing a saturated porous horizon in the limestone.

Vermilion.—In the Vermilion field, eastern Alberta, Franco-Riley 1, LSD 13, 20-

59-5w4, is testing the Cretaceous oil horizon at 1,830 ft. Vermilion Consolidated 15, LSD 6, 12-49-6w4, south of the field, is testing Devonian limestone at 4,031 ft.

Ram River.—In the Ram River-Clearwater area, in the northern Alberta foothills, Ram River Oils 3, LSD 12, 1-37-11w5, is deepening after encountering increased porosity in Devonian limestone at 5,515 ft.

Saskatchewan.—In Lloydminster field, western Saskatchewan, Community Services 1, LSD 12, 24-49-23w3, finished in the lower gas sand at 1,678 ft. with production officially reported at 3,700,000 cu. ft. and more than 375 lb. closed-in pressure.

MICHIGAN

More Activity Forecast For Ogemaw County

SAGINAW.—Extensive exploration in Foster Townsnip, Ogemaw County, was indicated last week when the state conservation department issued Muskegon Development Co. permits for five tests. Fifteen other drilling permits also were granted. There were 14 completions this week, including 7 oil wells, 2 in Bay County, 2 good producers in Isabella County's Coldwater field, 1 small well each in Van Buren, Missaukee and Montcalm counties. A small gas well and 6 dry holes, 3 of which were wildcats, completed the list.

WILDCAT FAILURES COMPLETED IN MICHIGAN

Bay County, Pinconning Township: Don Rayburn-Frank Roush 1 Arthur and Walter Breu, SW NW SE 27-17n-4e; dry in Dundee; TD 3,018 ft.

Mecosta County, Colfax Township: Chapman Oil Co. 1 Gertrude Burns, C-N½ SE SW 5-15n-9w; dry; TD 1,315 ft.

Osceola County, Highland Township: Gordon Oil Co. 1 Clyde and Ethel Weston, SE NW NW 22-20n-8w; dry in Monroe; TD 4,148½ ft.

ILLINOIS

Three Wildcats Find Oil In Three Counties

CENTRALIA.—Only 23 wells were reported during the past week, 11 oil wells and 12 dry holes. The oil wells averaged 181 bbl. per well in initial production. Six of the completions were wildcats and of these three were productive of oil.

Magnolia Petroleum Co. 1 Stanley, the most successful of the three productive wildcats, is 4 miles from other production in Clay County. It flowed 326 bbl. in 24 hours from Rosiclare lime at 3,003-05 ft. The well is in SW SW NE 12-4n-8e. H. H. Weinert 1 Homer Kisner, SW NE SE 31-5s-9e, White County, 4 miles southwest of Carmi, and 2 miles from other production, pumped 162 bbl. the first 12 hours, but it pumped off. Later it pumped 171 bbl. in 24 hours, with 3 bbl. of water. The third producing wildcat was good for only 5 bbl. of oil and 5 bbl. of water. It was F. D. Wicker 1 Bradley, SE SE SW 25-2n-10e, Richland County.

Aetna Oil Co. et al 1 Greathouse, SW NE NW 23-1n-10e, Edwards County, mentioned last week, was last reported pumping at the rate of 168 bbl. per day from McClosky lime at 3,247-54 ft. It is 2 miles from other production. It was not yet a completion.

The recent meager reports of completions and new operations in the state, due to unfavorable weather conditions, continued in the current week's reports and only 20 new operations were announced. Of these four were wildcats: W. Duncan 1 J. Woolard, NW SW NE 36-1s-13w, Wabash County; Phillips Petroleum Co. 1 R. Pearce, SE SE SE 35-6s-10e, and Magnolia Petroleum Co. 1 A. J. Williams, 960 ft. from north and 330 ft. from west lines, NE SE 18-4s-9e, both in White County, and Pure Oil Co. 1 Boos-B, NW NE NW 28-6n-10e, Jasper County.

SUCCESSFUL WILDCAT COMPLETIONS IN ILLINOIS

Clay County: Magnolia 1 Fletcher Stanley, SW SW NE 12-4n-8e, Rosiclare lime at 3,003-05 ft., TD 3,006 ft., acidized with 3,000 gal., flowed 326 bbl. in 24 hours. Location is 4 mi. from other production.

Richland County: F. D. Wicker 1 Bradley, SE SE SW 25-2n-10e, Levias lime (Lower O'Hara), 3,221-25 ft., TD 3,305 ft., PB to 3,300 ft., acidized with 2,000 gal., pumped 5 bbl. oil and 5 bbl. water.

White County: H. H. Weinert 1 Kisner, SW NE SE 31-5s-9e, Rosiclare lime 3,118-35 ft. and 3,141-46 ft., TD 3,185 ft., PB to 3,152 ft., perforated pipe at 3,139-45 ft. and 3,118-34 ft., acidized, pumped 171 bbl. oil and 3 bbl. water in 24 hours.

WILDCAT FAILURES COMPLETED IN ILLINOIS

Clay County: Jack Hammer et al 1 Klinger, NW NE SW 10-4n-8e, dry at 3,137 ft. Tar Springs 2,372 ft., Cypress 2,693 ft., Benoist 2,845 ft., Aux Vases 2,917 ft., Rosiclare 3,013 ft.

Franklin County: C. E. Brehm 1 U. S. Coal

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(Fig. F460)
THREE-PRONG GRAB
(Fig. F467)
Fig. F460 Fig. F467
THE HIGHER STANDARD
For fishing broken cable and sand line, Spang furnishes a variety of Center and Side Rope Spears, as well as Two- and Three-Prong Grabs.
Strands of cable left attached to the rope socket may be removed with the Spang Drill Mill, or the Spang Drive Down Socket or Trimmer.
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& Coke, NW NE SE 27-5s-4e, dry at 3,300 ft. No log available.

St. Clair County: Homer Luttrell 1 Hageman, NW NW NE 10-2n-6w, dry at 2,419 ft. Lower Glen Dean 487 ft., Cypress 613 ft., Aux Vases 742 ft., Ste. Genevieve 1,754 ft., Maquoketa 2,220 ft., Trenton 2,367 ft.

APPALACHIAN FIELD

Location Made for Second Deep Clinton Test

PITTSBURGH. — The Texas Co. has made a location for its second Clinton sand test in southwest Pennsylvania. It is on the J. P. Walker farm, Robinson Township, Washington County, near where Route 22 crosses the Allegheny-Washington County line, and is approximately 7,500 ft. north of a deep test drilled some years ago by the Peoples Natural Gas Co.

The Peoples Natural Gas Co. test on the J. E. McCollough farm in Cross Creek Township, Washington County, which has been shut down through the winter waiting for a heavier rig, has the new rig and is drilling at 4,307 ft.

In Marshall Township, Allegheny County, at the edge of an old oil pool, a local company completed a gas well in the Boulder sand on the Kunzman farm, near Warrendale, with an initial open flow of 500,000 cu. ft. with a rock pressure of 700 lb. at a total depth of 1,800 ft.

In Mercer County, United Natural Gas Co. is acidizing the test on Maude Davidson farm in Worth Township which had two gas pays in the Trenton lime. The hole was bottomed at 8,893 ft. with water breaking in at 8,880 ft. (Dolomite.) The Trenton was topped at 8,178 ft. with gas pays at 8,200 ft. and 8,582 ft.

In Tucker County, West Virginia, the Ohio Oil Co. shut down its test on the Kuykendall tract on Blackwater anticline in the Dry Fork district, to rig up a rotary to complete the well to the Oriskany sand. It was drilled with cable tools to 3,900 ft. At 3,848-61 ft., there was a fair showing of gas which was shot and gaged 100,000 cu. ft. after blowing open for 48 hours.

In Wirt County, Godfrey L. Cabot, Inc. bottomed its test on the Annie B. Smith farm in Elizabeth district, in Black lime (Marcellus) at 5,473 ft., after a bad fishing job due to a gas pocket. It will be plugged.

ROCKY MOUNTAIN

Test South of Elk Basin Opening New Field

DENVER.—Continental Oil Co. 1 Goodstein, NE SE SW 20-57n-99w, 3 miles south of the nearest producer in the Elk Basin field, on drill-stem test, filled 3½-in. drill pipe with 4,875 ft. of 28° plus gravity oil in 15 minutes, from Tensleep sand. The well topped Tensleep at 6,960 ft., found the first 10 ft. of sand tight, then went into saturated sand. Drill-stem test was made at 6,971-94 ft., and well is now bottomed at 7,004 ft., still in good sand.

The new discovery is probably on either a separate structure, or on a faulted area south of the main Elk Basin field, since it is producing oil at a level several hundred feet below the water line in the main field. It was drilled on a block of 5,760 acres in which Fred Goodstein retains a 50 per cent interest. Although a combination of gravimeter, seismograph, and surface work has been used, the structural picture is still not clear.

Stanolind to drill Meeker dome.—Stanolind Oil & Gas Co. is building road to location for a test to the Weber sandstone on the Meeker dome, Rio Blanco County, Colo., in its 1 Scott, C NE SW 20-1n-93w. This follows a deal reported in which Stanolind acquired a half-interest in the Meeker dome block from the Trinity Oil Co., of which R. S. Shannon is president.

The structure is located 12 miles southeast of Wilson Creek, which is producing from the Morrison and Sundance sands and has a 10,000-ft. test to the Weber under way. Meeker dome is also 60 miles east of the Rangely field, where major production is being developed in the Weber horizon.

The Meeker structure has been known for many years. Marland Oil Co. drilled a well in 1924 near the new location to a depth of 2,002 ft. where it encountered an enormous flow of hot water at the contact between the red beds and the Pennsylvanian. It was unable to shut off the water and the test was abandoned. At that time the Weber (Pennsylvanian) had never been tested in western Colorado and no further drilling was undertaken. The Ohio Oil Co. took an option on the structure in 1930, but it did not proceed with the test. The granite is expected at around 6,000 ft.

Keith gas discovery completed.—Texas Co. 1 Cicon, NE NW SW 29-36n-6e, Keith Prospect, Liberty County, Montana, which was reported as a gas discovery last December, made 3,000,000 cu. ft. per day with a shutin pressure of 993 lb. It had the top of the Madison at 2,990 ft. and was drilled to 3,221 ft. The casing was perforated at 2,892-2,910 ft. and 2,884-2,920 ft. with 74 shots.

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tinental Oil Co. is putting into operation this week the first unit of its recycling plant at the North McCallum field in Jackson County, Colo. The installation is unique in several respects and is the outgrowth of extensive experimentation in the past few years. The McCallum wells produce carbon dioxide gas. The crude oil is in the gas instead of the gas being in the oil. The company has worked out a system for separating the two elements and in so doing will utilize the gas to repressure the sand after the oil is recovered.

OHIO, KENTUCKY

Tuscarawas Co. Berea Gets Second Big Gas Well

COLUMBUS.--Frank Lyons 1 F. M. Cappel, Lot 37, Washington Township, Tuscarawas County, the second completion in the new Berea pool, gauged 68,000 cu. ft. at 970 ft., 184,000 cu. ft. at 1,009-12 ft., and increased to 3,885,000 cu. ft. at 1,025-33 ft. Top of Berea is 969 ft. and TD is 1,035 ft. Five additional locations have been staked near the two wells.

In the Duncan Falls pool, Belmont Quadrangle, 3 C. B. Saunders, Section 19, Wayne Township, Muskingum County, gaged 3,360,000 cu. ft. with 1,100 lb. rock pressure. Clinton sand was found at 4,100-47 ft.

Two producers were completed in the Newark-Mt. Vernon field. A. Willey 2 Russel Ashcraft, Section 13, Pike Township, Coshocton County, made 74 bbl. Pure Oil 1 Sam George, 1st Qr., Licking Township, Muskingum County, made 53 bbl. and 275,000 cu. ft. in 24 hours.

WILDCAT FAILURES COMPLETED IN OHIO

Belmont County, Union Township: Texas Co. 1 Lillie Gillespie, Section 4, Clinton, 7,253-7,405 ft., dry, TD 7,455 ft.

Medina County, Spencer Township—Belmont Quadrangle, 1 Asa Firestone, Section 24, Clinton — no sand, TD 2,598 ft.

WILDCAT FAILURES IN WESTERN KENTUCKY

Henderson County: Kingwood 1 Ira A. Crosby, C S½ 6-0-26, 2 mi. east of Enterprise, dry at 2,283 ft. Oil show in Penn sand 569 ft., upper Kincaid 1,063 ft., Glen Dean 1,595 ft., Jackson sand 1,784 ft., lower Jackson 1,811 ft. Barlow 1,857 ft., Ste Genevieve 2,107 ft. Penn sand was not drill-stem tested.

EASTERN KENTUCKY

ASHLAND.—Operations were light this week as only one well was completed. Kentucky-West Virginia Gas Co. 5564 on the Effie Slone property in Knott County was completed at a total depth of 1,615 ft., with a daily open flow of 400,000 cu. ft. of gas in the Big Lime.

KANSAS

Barton County Wildcat Swabs 10 Bbl. Per Hour

SOLAR OIL CO. 1 Dehrens, N½ SW NE 6-20s-15w, a wildcat in Barton County, swabbed 10 bbl. oil per hour for 10 hours from the Arbuckle, topped at 3,660 ft. After setting 5-in. pipe at 3,755 ft., perforations were made at 3,729-33 ft., and operators swabbed 6 bbl. oil per hour. The well was acidized with 500 gals., and 10 bbl. oil per hour was swabbed.

Graham County.— Winkler-Koch Engineering Co. 1 Faulkner, SW SE SE 27-10s-22w, is pumping 37° gravity oil from the Lansing, which was topped at 3,550 ft. Perforations were made at 3,884-92 ft., and operators swabbed 10 bbl. oil per day; after acidizing with 1,200 gal., the well swabbed 25 bbl. Plug was set at 3,800 ft., and perforations made at 3,629-33 ft., where the well pumped 4 bbl. of oil per hour, an estimated 90 bbl. per day. Operators will acidize.

Stanton County.—Stanolind Oil & Gas Co. 1 Parker, center of 31-28s-39w, just west of Hugoton field, has tested 1,500,000 cu. ft. of gas from perforations at 2,386-2,411 ft., after acid. Herrington, the pay zone, was cut at 2,333 ft.

New locations reported this week from Kansas number only 25, including 6 wildcats. New exploratory tests are scattered, with one each scheduled for Barton, Butler, Ellis, Gray, Marion, and Sedgwick counties.

LA.-ARK.

Bear Creek Area Has Large Condensate Well

SHREVEPORT. — Bear Creek area has been given a large condensate well by Southern Natural Gas Co. 1 Fee, 4-16n-6w, in Bienville Parish. Situated on the west edge of the field, the operation was drilled to 7,600 ft., and the Travis Peak zones were tested with no shows. Perforations were made at 6,900-50 in the Pettit zone, and 170,000,000 cu. ft. of wet gas was found.

Murphy Diesel Model ME-66, 6 x 6½, 6-cyl., 150 H.P. continuous, 180 H.P. intermittent, full Diesel engine, as furnished to Unit Rig & Equipment Co., for use on Unit Rotary Drilling Rigs.

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The well was shut in without official gage.

In the McKamie pool of Lafayette County, in Arkansas, Barnsdall Oil Co. et al 1 Moore-McClendon, 100 ft. east of center of NE quarter of Section 34-17s-24w, cored from 7,455 to 7,465 ft., and recovered 6 ft. and 8 inches. The top 6 ft. of sand had a good show of oil. Crew is taking a drill-stem test.

WILDCAT FAILURES COMPLETED IN NORTH LOUISIANA

Jackson County: Texas 1 Tremont Lumber Co., NE NE SW 6-16n-1e, dry, TD 7,028 ft.

WILDCAT COMPLETIONS AND DISCOVERIES

	Week ended Mar. 17, 1945					Cumulative total, 1945				
	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Ohio	0	0	0	2	2	0	0	5	13	18
Indiana	0	0	0	0	0	0	0	0	2	2
Illinois	3	0	0	3	6	14	0	0	45	59
Kentucky	0	0	0	1	1	2	0	1	10	13
Michigan	0	0	0	3	3	1	0	0	45	46
Kansas	0	0	0	0	0	7	0	3	66	76
Neb., Mo., Iowa	0	0	0	0	0	0	0	0	7	7
Oklahoma	1	0	1	2	4	24	0	3	57	84
Texas:										
North Central	1	0	0	5	6	29	0	3	94	126
West	5	0	0	3	8	11	0	0	62	73
Panhandle	0	0	0	0	0	0	0	0	3	3
Eastern	0	0	0	2	2	5	2	0	18	25
Gulf Coast	4	0	1	5	10	16	1	9	60	86
Southwest	0	0	0	2	2	5	0	3	42	50
Total Texas	10	0	1	17	28	66	3	15	279	363
Louisiana:										
Northern	0	0	0	1	1	1	0	1	16	18
Southern	1	0	0	0	1	5	0	0	9	14
Total Louisiana	1	0	0	1	2	6	0	1	25	32
Arkansas	0	0	0	0	0	0	0	0	13	13
Mississippi	2	0	0	1	3	3	0	0	24	27
Ala., Ga., Florida	0	0	0	1	1	0	0	0	5	5
Montana	0	0	0	0	0	3	0	0	3	6
Wyoming	0	0	0	0	0	6	0	0	8	14
Colorado-Utah	0	0	0	0	0	0	0	0	3	3
New Mexico	0	0	0	0	0	3	0	0	16	19
California	0	0	0	4	4	0	0	2	44	46
Total United States	17	0	2	35	54	135	3	30	665	333
Total previous week	11	2	3	58	74					

OKLAHOMA

Gulf Oil Will Test a Block In Kingfisher County

GULF OIL CORP. made a location for a wildcat in Kingfisher County, Oklahoma, 4½ miles northwest of the known limits of the West Edmond field. It is 1 Triplett, C NE SW 8-15-5w. It will seek the Hunton lime and is expected to go to the 7,500-ft. level, if necessary. Gulf owns a large lease spread in Sections 5, 6, 7, 8, 9, 16, 17 and 18-15n-5w. Production in Kingfisher County thus far is altogether in Sections 25 and 36-15n-5w.

A total of 438 Hunton lime oil wells were accounted for at the close of the past week in the West Edmond field, the Sohio Oil Co. leading all operators with 102 wells. There were 73 wells drilling or rigging up; 17 derricks up and 27 locations staked. Fifteen wells were awaiting production tests. In addition to the Hunton lime wells, 10 oil wells and 1 gas well are producing from Bartlesville sand, making a total of 449 producing wells in the field.

Sinclair Prairie Oil Co. will soon start drilling a wildcat test in NW NW SE 36-7n-13w, in northwestern Caddo County. Deese sand at about 4,500 ft. will be the objective. Caddo County's most closely watched test at present is The Texas Co. 1 Worden, SE SE SE 17-8n-10w, which was last reported drilling below 9,500 ft. Henry Schafer, Inc., 1 Cook, NE SE NE 35-5n-9w, Caddo County wildcat, is shut down at 9,200 ft. after setting 5½-in. casing at 9,150 ft., which will be perforated.

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Medrano sand in this test was found from 8,830 to 9,150 ft. Little Nick Oil Co. 4 Rigney, SW SE NW 12-5n-9w, in the Cement field in Caddo County, which blew out last mid-July, is still a wild well. The gas was ignited as a safety measure and all attempts to kill the production have been futile.

Continental Oil Co.'s fourth producing well in the Big Ben pool in Osage County, producing from Layton sand flowed 436 bbl. in 24 hours on its completion test. The well is in SW SW SE 20-25n-3e, and was mentioned last week.

Magnolia Petroleum Co.'s discovery well of the Lexington pool in Cleveland County, 1 Anneler, C SW NE 26-6n-1w, was put on the pump and produced 95 bbl. the first 24 hours. The pay is Bartlesville sand at 6,075-83 ft., total depth 7,035 ft.

Corporation Commission of Oklahoma has granted permission to Amerada Petroleum Corp. to start flooding operations in the Adams pool in Hughes County. The company's 1 Stewart, NW NW SW 31-9n-9e, will be the first injection well. There are seven oil wells and a gas well in the field. The pool produces

(Continued on page 127)

MISSISSIPPI

Offset to Langsdale Discovery Installs Pump

JACKSON.—Kirby Petroleum Co. "A"-1 Long Bell Petroleum Co., NE SE SE 25-1n-17e, southwest offset to the Langsdale pool opener, Kirby 1 Long Bell, is installing pump. After perforating at 3,700-11 ft., oil and same salt water was swabbed into the pits. Tops on the well are Wilcox 1,530 ft., Clayton 2,575 ft., Selma 2,590 ft., and Eutaw 3,700 ft.

Two other wells are drilling in the Langsdale area, both Kirby Petroleum wells. The "B"-3 Long Bell Petroleum, SW SW SW 30-1n-18e, is setting up derrick, and the "A"-2 Long Bell Petroleum, NW NE SE 25-1n-17e, is drilling below surface casing.

SUCCESSFUL WILDCAT COMPLETIONS IN MISSISSIPPI

Jasper County: Soso Condensate Field Discovery. Gulf Refining 1 Edwards-Bailey unit, 600 ft. south and 705 ft. west of NE corner of NW SE 27-10n-13w, in four hours, flowed 16 bbl. of 67° gravity condensate and 525,000 cu. ft. of gas, through tubing choke, pay zone 6,590-6,600 ft., TD 8,151 ft., Christmas 6,590 ft., Tuscaloosa 6,696 ft., Marine Tuscaloosa 7,490 ft., Massive sand 7,860 ft.

Marion County: Hub Condensate Field Discovery. Humble 1 Evans, 660 ft. south and 1,980 ft. west of NE corner of Section 15-2n-18w, flowed 716 bbl. of dark colored condensate, gravity 52°, and 1,550,000 cu. ft. of gas, gas-oil ratio 14,750, 3/32-in. choke, TD 9,554 ft., pay zone 9,127-29 ft., Marine Tuscaloosa 8,589 ft., first porous sand 9,066 ft., Massive sand 9,236 ft., Comanche 9,487 ft.

WILDCAT FAILURE COMPLETED IN MISSISSIPPI

Tallahatchie County: Herbert M. Ogg et al 1 Bardwell, 330 ft. south and 660 ft. east of NW corner of Section 5-25n-3e, dry, TD 3,650 ft., Eutaw 2,608 ft., Tuscaloosa 3,205 ft.

WILDCAT FAILURE COMPLETED IN FLORIDA

Santa Rosa County: Hunt Oil 2 Fosheee-Miller Mills Lumber Co., SE SE 8-5n-28w, dry, TD 6,597 ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, Washington, D. C. Notice is hereby given that the lands herein described within the Salt Creek oil and gas field, 6th P. M., Wyoming, are offered to qualified bidders of the highest cash amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U.S.C., sec. 226), in the following parcels: Parcel No. 1, T. 40 N., R. 78 W., sec. 7, SW¼NE¼, NW¼, NW¼SE¼; 230.12 acres. Parcel No. 2, T. 40 N., R. 78 W., sec. 17, W½SW¼; sec. 18, E½E½, SW¼NE¼; sec. 20 NW¼NW¼; 320 acres. Parcel No. 3, T. 40 N., R. 78 W., sec. 20, E½SW¼; sec. 29, W½NE¼, E½NW¼, NE¼SW¼, SE¼; 440 acres. Parcel No. 4, T. 40 N., R. 78 W., sec. 33, W½NW¼; 80 acres. Parcel No. 5, T. 39 N., R. 78 W., sec. 4, E½W½; 159.09 acres. Parcel No. 6, T. 39 N., R. 78 W., sec. 7, NE¼, SE¼NW¼, 200 acres. Parcel No. 7, T. 39 N., R. 78 W., sec. 7, NE¼SW¼, S½SW¼ N½SE¼, SE¼SE¼; sec. 18, NE¼NE¼; 277.70 acres. Parcel No. 8, T. 39 N., R. 79 W., sec. 4, NE¼, E½NW¼, NE¼SW¼, SE¼; 438.38 acres. Parcel No. 9, T. 39 N., R. 79 W., sec. 13, NW¼NE¼, E½NW¼, W½SE¼; 200 acres. Parcel No. 10, T. 39 N., R. 79 W., sec. 14, N½SE¼; 80 acres. Parcel No. 11, T. 39 N., R. 79 W., sec. 24, SW¼NE¼, NE¼NW¼; 80 acres. Parcel No. 12, T. 39 N., R. 78 W., sec. 17, NW¼SW¼; 40 acres. Parcel No. 13, T. 39 N., R. 78 W., sec. 18, SE¼NE¼; 40 acres. Parcel No. 14, T. 39 N., R. 78 W., sec. 19, NE¼NE¼, N½SE¼NE¼; sec. 20, NW¼NW¼; 100 acres. Parcel No. 15, T. 39 N., R. 78 W., sec. 19, SE¼SE¼; sec. 30, NE¼NE¼; 80 acres. Total acreage 2765.29. Sealed bids will be received in the office of the Commissioner of the General Land Office, Interior Department Building, Washington 25, D. C., up to 12 noon, April 5, 1945. Bids must be submitted on each parcel separately but if two or more parcels are awarded to the same bidder they may be included in a single lease provided the aggregate acreage does not exceed 640 acres. Each bidder must submit a certified check or cash for one-fifth of the amount bid, payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the first year's rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be filed by the successful bidders prior to the issuance of the leases. The deposits of the other bidders will be returned upon acceptance of the successful bid by the Secretary of the Interior. The envelopes should be plainly marked "Bid for Parcel No. , Salt Creek oil and gas field, Wyoming. Not to be opened before noon—April 5, 1945." No bids received after the date fixed herein for submitting bids will be considered. The successful bidder will be required to agree not to discriminate against any employee or applicant for employment because of race, creed, color, or national origin, and to require an identical provision to be included in all subcontracts. Bidders are warned against violation of section 59, U.S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Fred W. Johnson, Commissioner.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, Washington, D. C. Notice is hereby given that the NE¼NE¼ sec. 18, T. 18 N., R. 103 W., 6th P. M., Wyoming, 40 acres within the known geologic structure of the Dry Lake area of the South Baxter Basin gas field, Wyoming, is offered to the responsible qualified bidder of the highest cash bonus per acre for lease under section 17 of the mineral leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226). Sealed bids will be received in the office of the Commissioner of the General Land Office, Interior Building, Washington 25, D. C., up to 12 noon, April 3, 1945. Each bidder must submit a certified check or cash for one-fifth of the amount bid, payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required by section 7 of Circular No. 1386. The remainder of the bonus and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished by the successful bidder prior to the issuance of the lease. The deposits of the other bidders will be returned upon acceptance of the successful bid by the Secretary of the Interior. The envelopes should be plainly marked "Bid for lease in Dry Lake area, South Baxter Basin gas field, Wyoming. Not to be opened before noon, April 3, 1945." No bid received after the time fixed herein for submitting bids will be considered. The successful bidder will be required to agree not to discriminate against any employee or applicant for employment because of race, creed, color or national origin and to require an identical provision to be included in all subcontracts. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Fred W. Johnson, Commissioner.

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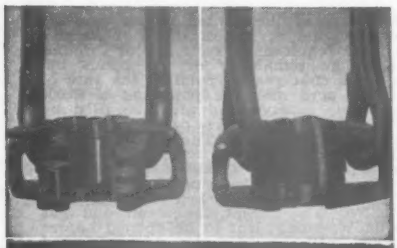

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Among the Drilling Contractors

Loffland Brothers Drilling Co. is rigging up heavy equipment to drill ahead at Superior Oil Co. of California 1 Manning, in 27-22n-10w, Major County, Oklahoma. The test was drilled to 4,835 ft. when stop was made for the heavier equipment.

Clifford A. Perry is contractor on the Perry, Gould & Cross 1 Edna Sessions et al, in E½ SE NW 17-9n-5w, Montcalm County, Michigan.

Charles Mills of Lloydminster, Sask., who recently finished a good gasser for Community Services south of that town, has moved his light rotary rig to LSD 15, 24-49-28w3, for the second of a series of tests.

Lupher Drilling Co. will drill two tests for Sohio Petroleum Co. in Isabella County, Michigan. These are the 1 and 2 Fred L. Hoffman, in C N½ SE NW and C N½ SW NW 29-16n-6w.

Alberta Drilling & Development Co. of Calgary, Alta., is down more than 4,555 ft. and believed near the Ellis sand on a test for McLeod Oil Co. in LSD 13, 14-1-21w4, in the Del Bonita field of southern Alberta.

Fowler Drilling Co., Los Angeles, has been awarded contracts to redrill five wells for Royalty Service Corp. in the Wilmington field, California, and has started on the first well. It is necessary at times to redrill producing wells at Wilmington as the fine sand eventually closes the perforations.

Jay W. Gifford, California drilling contractor, has the contract to drill a new well for Wood-Callahan Oil Co. in the Torrance field.

B & B Drilling Co. has the contract on the Kingwood Oil Co. 1 Hoover Estate, in NE NW SW 36-13-14w, Russell County, Kansas, which was running surface pipe. This test is just east of Russell and 1½ miles from the Williamson pool production.

Clapsaddle Drilling Co. has been awarded the drilling contract on the

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Harris Oil Co. 1 Freeman, in SW SE NW 30-4n-13w, Allegan County, Michigan.

Charles W. Cook is the drilling contractor on the Louis Zellman 1 Roy Shields and Adelia Hutty, in SW NW SW 36-4n-13w, Allegan County, Michigan.

Goll, Graves & Mechling, Inc., are contractors on the Basin Oil Co. and Don Rayburn 2 Orville Peters, in NW NE NE 7-19n-4e, Arenac County, Michigan.

Robert W. Atha will drill the Gulf Refining Co. 1 T. J. Hartley, in N½ SW SW 28-15n-4e, Bay County, Michigan.

Acme Drilling Co. is the contractor on the Union Drilling & Producing Co. 1 Leonard N. Piggot, in SE SE SW 30-8n-3w, Clinton County, Michigan.

Oklahoma Fields

(Continued from page 125)

about 546 bbl. of oil and 1,144 bbl. of salt water per day.

SUCCESSFUL WILDCAT COMPLETIONS IN OKLAHOMA

Garvin County: New pay discovery in Hoover, Northwest pool. Helmerich & Payne 1 Garther, SW SW NE 14-1n-1w, flowed 200 bbl. in 24 hours from sand at 2,446-97 ft., through ½-in. tubing choke, gravity 45.6°, TD 2,525 ft.

Kay County: New gas field discovery. Kay County Gas 1 Fruits, NW NW SE 3-25n-2w, flowed 8,500,000 cu. ft. of gas in 24 hours from pay zone 4,383-4,475 ft., TD 4,735 ft., Oswego 3,928 ft., May 4,360 ft., Woodford 4,656 ft., Wilcox 4,709 ft.

WILDCAT FAILURES COMPLETED IN OKLAHOMA

Garvin County: B. & M. Construction 1 Hill, NE SW 4-2n-1e, dry, TD 4,208 ft., McLish sand 3,944 ft.

Helmerich & Payne A-3 Freeman, SW SE NW 24-1n-1w, dry, TD 2,515 ft.

CALENDAR

March

American Petroleum Institute, Pacific Coast District, Division of Production, wartime conference, Biltmore Hotel, Los Angeles, March 29.

April

I.P.A.A., midyear directors meeting, New Orleans, La., April 16-18.

May

American Institute of Chemists, Medal meeting, Columbus, Ohio, May 11.

June

Interstate Oil Compact Commission, quarterly meeting, Oklahoma City, June 15-16.

Canadian Gas Association, annual convention, Manoir Richelieu Hotel, Murray Bay, Quebec, June 19-22.

October

Texas Mid-Continent Oil and Gas Association, Rice Hotel, Houston, October 4-6.

I.P.A.A., annual membership meeting, convention city to be selected later, October 15, 16 and 17.

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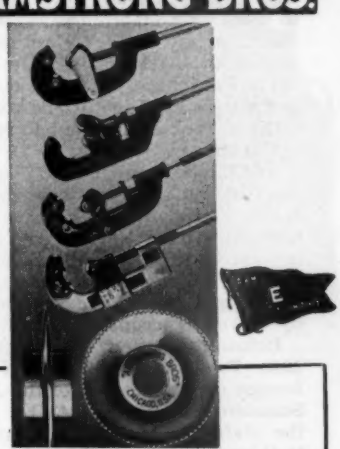

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PERSONALS

Now Creole's Chief Executive Officer In New York

HORRY F. PRIOLEAU, whose experience has familiarized him with foreign aspects of the oil business, has been elected executive vice president of Creole Petroleum Corp. and becomes Creole's chief executive officer in New York. Starting to work as a laboratory assistant in the Charleston, S. C., refinery of Standard Oil Co. of New Jersey in 1921, Prioleau received successive promotions until in 1925 he was sent to New York as assistant to its general manager.

In 1929 he went to The Hague as head of the refinery department of N. V. Nederlandsche Koloniale Petroleum Mij., a New Jersey Standard affiliate. He became general manager in 1934 and continued at The Hague until forced out in 1940 by German occupation of Holland.

Returning to New York in August 1940, Prioleau worked for various foreign operating units of the Jersey Standard group. In 1943 he joined the staff of Creole as an assistant to the president. Prioleau was elected a vice president of Creole in July 1944 and became a director a month later. He was born in Charleston, S. C., and is a graduate of University of Virginia.

Dr. E. F. Davis has been elected a director of Shell Oil Co., Inc., succeeding **David Heggie**, of San Francisco, who retired. Dr. Davis, a vice president of Shell Oil, has been chief consulting geologist for the Shell Union group of companies, with his headquarters in Los Angeles, since last August. Before that he was vice president in charge of geology and production in Shell's Pacific Coast territory. He is a graduate of University of California, and received his Ph.D. from that institution.

Walter E. Black, a director of Standard Oil Co. of Pennsylvania since 1930, has been elected vice president. **J. A. Lorimer**, assistant division manager since January 1, has been chosen a director, and will perform duties of both posts. Black joined the Baltimore division of Standard Oil Co. of New Jersey in 1905. He was in military service during the Mexican border trouble and in World War 1, rejoining the company in 1919. He was transferred to the Pennsylvania unit in 1929.

John K. Wright, Jr., formerly pool engineer for the Dorcheat (Arkansas) Operators Committee and petroleum engineer for McAlester Fuel Oil Co., operator of the Dorcheat unit, is now associated with the Mississippi Oil and Gas Engineering Committee, Jackson, as senior petroleum engineer.

Earl D. Allen has been transferred from Grayville, Ill., to Oklahoma City as district foreman for Toronto Pipe Line Co.

H. L. Stone has resigned as director, executive vice president, general counsel and member of the executive committee and the finance committee of Gulf Oil Corp.; as director, executive vice president and general counsel of Gulf Refining Co., and as director and general counsel of all other principal Gulf companies. He will continue as consulting counsel, with headquarters in his home town of San Angelo. **David Proctor**, for many years assistant general counsel and secretary of Gulf Oil Corp., Gulf Refining Co., and all other principal Gulf companies, resigned from these positions and has been elected director, vice president, general counsel and member of the finance committee of Gulf Oil Corp.; director, vice president and general counsel of Gulf Refining Co. and director and general counsel of all other principal Gulf companies. **P. O. Settle**, attorney for the Gulf companies for many years, with headquarters in Fort Worth, has been elected associate general counsel and secretary of Gulf Oil Corp., Gulf Refining Co., and all other principal Gulf companies. His headquarters hereafter will be in Pittsburgh.

Wilbur H. Seifert, for the past year in charge of a survey of oil and gas resources of the Warren (Pennsylvania) quadrangle, is at the head of a branch office of Pennsylvania Topographic and Geologic Survey opened in Oil City. For several years the branch headquarters had been in Pleasantville.

W. G. Violette, of Louisville, Ky., has been elected president of Standard Oil Co. of Kentucky, succeeding **William E. Smith**, who retired on account of ill health. Violette has been in the company's service 41 years.

Frank R. Wilmer, formerly with E. B. Hall & Co., who drilled wells in the Wilmington field, California, for Union Pacific Railroad Co., is now at Maracaibo, Venezuela, in the employ of Caribbean Petroleum Co. Union Pacific has adopted the practice of having contractors do all its drilling at Wilmington.

P. W. Hennessey, division superintendent at Casper, Wyo., of The Ohio Oil Co.'s pipe-line department, has been granted a leave of absence owing to ill health. **R. M. Sackett** is filling his place.

C. A. Patchen, scout for Tide Water Associated Oil Co. in Oklahoma City, was elected last week at Ardmore to represent Oklahoma scouts at the meeting of National Oil Scouts and Landmen's Association to be held in Dallas March 26. **T. G. Price**, The Carter Oil Co. scout in Ardmore, was chosen editor of the yearbook to succeed **F. O. Jackson**, Phillips Petroleum Co. scout in Shawnee, who resigned.

R. N. Dreiman was elected vice president and comptroller of Pacific Public Service Co. at the annual meeting in Los Angeles. **J. K. Horton** was elected secretary and assistant treasure. Officers reelected include **E. G. Lawson**, president; **H. L. Farrar**, vice president; **H. D. Armstrong**, treasurer. **H. C. Judd** was recently elected chairman, succeeding **H. D. Collier**, who will remain a member of the board.